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TRANSACTIONS

OF THE

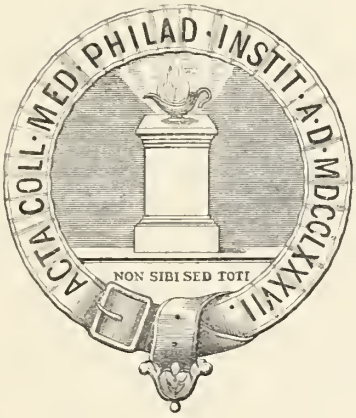
COLLEGE OF PHYSICIANS

OF

PHILADELPHIA.

THIRD SERIES.

VOLUME THE TWENTY-EIGHTH.



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1906.

NOTICE.

The present volume of TRANSACTIONS contains the papers read before the College from January, 1906, to December, 1906, inclusive.

The Committee of Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its TRANSACTIONS.

EDITED BY

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COLLEGE OF PHYSICIANS OF PHILADELPHIA.

1906.

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LIST

OF THE

PRESIDENTS OF THE COLLEGE FROM THE TIME OF ITS INSTITUTION.

ELECTED	
1787	JOHN REDMAN
1805	WILLIAM SHIPPEN
1809	ADAM KUHN
1818	THOMAS PARKE
1835	THOMAS C. JAMES *
1835	THOMAS T. HEWSON
1848	GEORGE B. WOOD
1879	W. S. W. RUSCHENBERGER
1883	ALFRED STILLÉ
1884	SAMUEL LEWIS †
1884	J. M. DA COSTA
1886	S. WEIR MITCHELL
1889	D. HAYES AGNEW
1892	S. WEIR MITCHELL
1895	J. M. DA COSTA
1898	JOHN ASHHURST, JR.
1900	W. W. KEEN
1902	HORATIO C. WOOD
1904	ARTHUR V. MEIGS

* Died four months after his election.
† Resigned on account of ill-health.

FELLOWS

OF THE

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

DECEMBER, 1906.

* Non-resident Fellows.
† Fellows who have commuted dues.

ELECTED

*1883. Abbot, Griffith E., Ph.D., M.D. Leominster, Mass.

1892. Abbott, Alex. C., M.D., Professor of Hygiene and Bacteriology, and Director of the Laboratory of Hygiene in the University of Pennsylvania. 4229 Baltimore Ave.

1905. Adler, Lewis H., Jr., M.D., Professor of Diseases of the Rectum in the Philadelphia Polyclinic and College for Graduates in Medicine; Prosector to the Professor of Anatomy in the University of Pennsylvania; Consulting Surgeon to the Charity Hospital. 1610 Arch Street.

1903. Allen, Alfred Reginald, M.D. 111 S. Twenty-first St.

1906. Allen, Francis Olcott, Jr., A.B., M.D., Surgeon to the Dispensary of the Presbyterian Hospital; Surgeon to the Dispensary of the Methodist Episcopal Hospital. 323 S. Sixteenth St.

1896. Allyn, Herman B., M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital; Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania. 501 S. Forty-second St.

1888. Anders, James M., M.D., LL.D., Professor of the Theory and Practice of Medicine and Clinical Medicine in the Medico-Chirurgical College; Physician to the Medico-Chirurgical and Samaritan Hospitals. 1605 Walnut St.

1869. Andrews, T. Hollingsworth, M.D. 1119 Spruce St.

ELECTED

1905. Anspach, Brooke M., M.D., Gynecologist and Obstetrician to the Philadelphia Hospital; Assistant Gynecologist to the University Hospital; Instructor in Gynecology in the University of Pennsylvania. 1928 Chestnut St.

1905. Appleman, Leighton F., M.D., Demonstrator of Pharmacy and Materia Medica, and Instructor in Therapeutics in the Jefferson Medical College; Instructor in Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmologist to the Frederick Douglass Memorial Hospital. 1708 Pine St.

*1882. Ashbridge, Richard, M.D. West Whiteland, Pa.

1906. Ashhurst, Astley P. C., A.B., M.D., Surgeon to the Dispensary of the Episcopal and of the Children's Hospitals; Assistant Surgeon to the Orthopædic, and to the Dispensary of the German Hospital; Chief of the Gynecological Dispensary of the Pennsylvania Hospital; Prosector to the Associate Professor of Applied Anatomy in the University of Pennsylvania. 2000 DeLancey Place.

1893. Ashton, Thomas G., M.D., Adjunct Professor of Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital. 1814 S. Rittenhouse Square.

1857. Atlee, Walter Franklin, A.M., M.D., Corresponding Member of La Société des Sciences Médicales de Lyons; Consulting Surgeon to St. Luke's Hospital, Bethlehem; Visiting Physician to the Preston Retreat. 210 S. Thirteenth St.

1906. Babbitt, James A., A.B. (Yale), A.M. (Haverford), M.D. 121 S. Eighteenth St.

1852. Bache, Thomas Hewson, M.D. 233 S. Thirteenth St.

1903. Bacon, John, M.D. Torresdale, Pa.

†1892. Baker, George Fales, B.S., M.D. 1818 Spruce St.

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital and to the Gynecological Out-patient Department of the Pennsylvania Hospital; Consulting Surgeon to the Frederick Douglass Memorial Hospital. 2219 DeLancey Place.

1898. Balliet, Tilghman M., A.M., M.D., Professor of Therapeutics at Dartmouth College, Hanover, N. H.; Physician to the Old Man's Home. 3709 Powelton Ave.

ELECTED

1883. Baum, Charles, A.M., M.D., Ph.D. 1828 Wallace St.

1883. Beates, Henry, M.D. 260 S. Sixteenth St.

1860. Benner, Henry D., M.D. Broad and Dickinson Sts.

1874. Bennett, W. H., A.M., M.D., Physician-in-Charge of the Seashore House for Invalid Children, and of the Seaside House for Invalid Women, Atlantic City; formerly Physician to the Episcopal Hospital, and Physician-in-Charge of St. Christopher's Hospital for Children. 1837 Chestnut St.

1896. Beyea, Henry D., M.D., Associate in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital. 1734 Spruce St.

†1884. Biddle, Alexander W., M.D. Chestnut Hill.

1884. Biddle, Thomas, M.D. 122 S. Twenty-second St.

*1903. Biggs, Montgomery H., M.D. Rutherfordton, N. C.

1904. Birney, Herman H., M.D. 4016 Chestnut St.

*1866. Black, J. J., M.D. New Castle, Del.

1894. Bliss, Arthur Ames, M.D., Laryngologist and Aurist to the German Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 117 S. Twentieth St.

*1867. Boardman, Charles H., M.D., 322 Fifty-Second St., Brooklyn, N. Y.

1894. Bochroch, Max H., M.D., Demonstrator of Neurology and Chief Clinical Assistant in the Nervous Department of the Jefferson Medical College Hospital; Neurologist to the Out-patient Department of St. Joseph's Hospital. 937 N. Eighth St.

1896. Boger, John A., M.D., Surgeon to St. Mary's Hospital; Surgeon to the Dispensary of the Episcopal Hospital. 2213 N. Broad St.

1891. Boyd, George M., M.D., Clinical Professor of Obstetrics in the Medico-Chirurgical College; Physician to the Philadelphia Lying-in Charity Hospital and Nurse School. 1909 Spruce St.

†1884. Bradford T. Hewson, M.D. 125 S. Eighteenth St.

1903. Branson, Thomas F., M.D., Attending Physician to the Bryn Mawr Hospital. Rosemont, Pa.

1856. Brinton, John H., M.D., LL.D., Emeritus Professor of the Practice of Surgery and of Clinical Surgery in the Jefferson

ELECTED

Medical College; Consulting Surgeon to St. Joseph's Hospital and to the Southwestern Hospital of Philadelphia. 1423 Spruce St.

1891. Brinton, Lewis, M.D., Visiting Physician to the Nervous Department of the Howard Hospital. 802 N. Broad Street.

1900. Brinton, Ward, M.D., Demonstrator of Physical Diagnosis in the Jefferson Medical College; Physician to the Dispensary of St. Christopher's Hospital for Children; Assistant in the Medical Dispensary of Jefferson Medical College Hospital 1423 Spruce St.

1887. Brubaker, Albert P., M.D., Professor of Physiology in the Pennsylvania College of Dental Surgery; Adjunct Professor of Physiology and Hygiene in the Jefferson Medical College; Lecturer on Anatomy and Physiology in the Drexel Institute. 105 N. Thirty-fourth St.

*1890. Brush, Edward N., M.D., Medical Superintendent of the Shepherd and Enoch Pratt Hospital. Station A, Baltimore, Md.

*1851. Bullock, William R., M.D. Tenth and Jefferson Sts., Wilmington, Del.

1906. Burns, Stillwell C., M. D., Lecturer on Surgery in the Medico-Chirurgical College; Assistant Surgeon to the Medico-Chirurgical Hospital. 1326 Spring Garden St.

1892. Burr, Charles W., M.D., Professor of Mental Diseases in the University of Pennsylvania; Neurologist to the Philadelphia Hospital. 1327 Spruce St.

1906. Butler, Ralph, M.D., Chief of the Dispensary for Diseases of the Ear at the University Hospital; Chief of the Dispensary for Diseases of the Ear, Nose and Throat at the German Hospital; Assistant Laryngologist to the Philadelphia Hospital. 1824 Chestnut St.

*1886. Cadwalader, Charles E., M.D. 240 S. Fourth St.

1905. Cameron, George A., M.D., Physician to the Germantown Hospital. S. E. cor. School House Lane and Greene St., Germantown.

1905. Carmany, Harry S., M.D., Surgeon to St. Timothy's Hospital, Roxborough; Surgeon to the Dispensary of the Episcopal Hospital. 366 Green Lane, Roxborough.

ELECTED

1905. Carpenter, Herbert B., M.D., Physician to the Dispensary of the Children's Hospital. 1805 Spruce St.

1895. Carpenter, John T., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Assistant Ophthalmic Surgeon to the University Hospital; Attending Ophthalmologist to the Bryn Mawr Hospital. 1624 Walnut St.

*1897. Carter, William S., M.D., Professor of Physiology in the University of Texas. Galveston, Texas.

1892. Cattell, Henry W., A.M., M.D., Editor of *Medical Notes and Queries;* Author of *Post-mortem Pathology;* American Editor and Translator of Ziegler's *Special Pathological Anatomy;* Editor of Lippincott's *Medical Dictionary.* 3709 Spruce St.

*1892. Cerna, David, M.D., Ph.D., Corresponding Fellow of the Sociedad Española de Higiene of Madrid. Monclova, Coah, Mexico.

1900. Chance, Burton, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmologist to the Germantown Dispensary and Hospital. 235 S. Thirteenth St.

1885. Chapin, John B., M.D., LL.D. (Jefferson and Williams), Physician-in-Chief to the Pennsylvania Hospital for the Insane. Pennsylvania Hospital for the Insane.

1880. Chapman, Henry C., M.D., Professor of the Institutes of Medicine and of Medical Jurisprudence in the Jefferson Medical College. 2047 Walnut St.

1900. Chase, Robert Howland, A.M., M.D., Superintendent of the Friends' Asylum for the Insane. Friends' Asylum, Frankford.

*1868. Cheston, D. Murray, M.D. Harwood P. O., Md.

1897. Cheston, Radcliffe, M.D. Chestnut Hill.

1904. Christian, Hilary M., M.D., Clinical Professor of Genito-Urinary Diseases in the Medico-Chirurgical College; Professor of Genito-Urinary Diseases in the Philadelphia Polyclinic. 1344 Spruce St.

1903. Chrystie, Walter, M.D. Bryn Mawr, Pa.

1899. Clark, John G., M.D., Professor of Gynecology in the University of Pennsylvania; Gynecologist-in-Chief to the University Hospital. 2017 Walnut St.

1897. Claxton, Charles, A.M., M.D. 5137 Morris St., Germantown.

1872. Cleemann, Richard A., M.D. 2135 Spruce St.

ELECTED

1896. Cleveland, Arthur H., M.D., Clinical Professor of Laryngology in the Medico-Chirurgical College; Laryngologist to the Medico-Chirurgical Hospital; Laryngologist and Aurist to the Presbyterian Hospital, and to the Pennsylvania Institution for the Deaf and Dumb. 256 S. Fifteenth St.

1903. Coates, George M., M.D., Surgeon to the Dispensary of the Children's Hospital; Instructor in Otology in the Philadelphia Polyclinic; Visiting Physician to the Philadelphia Orphanage; Major and Surgeon, 2d Regiment, National Guard of Pennsylvania. 334 S. Nineteenth St.

1888. Cohen, Solomon Solis, M.D., Professor of Clinical Medicine in the Jefferson Medical College; Physician to the Jefferson Medical College Hospital, to the Philadelphia Hospital, to the Jewish Hospital, and to the Rush Hospital. 1525 Walnut St.

1898. Coles, Stricker, M.D., Demonstrator and Clinical Lecturer on Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson Maternity. 249 S. Fifteenth St.

1901. Coley, Thomas Luther, A.B., M.D., Attending Physician to the Methodist Episcopal Hospital of Philadelphia. 257 S. Twenty-first St.

1903. Cooper, J. Cardeen, M.D., Consulting Physician to the Methodist Home for the Aged. 1016 Lehigh Ave.

1903. Coplin, W. M. L., M.D., Professor of Pathology in the Jefferson Medical College; Pathologist to and Director of the Laboratories of the Jefferson Medical College Hospital; Pathologist to the Philadelphia Hospital and to the Friends' Asylum for the Insane, Frankford; Bacteriologist to the Pennsylvania State Board of Health. 1529 S. Broad St.

1904. Craig, Frank A., M.D., Assistant Instructor in Medicine in the University of Pennsylvania; Member of Staff of the Henry Phipps Institute; Examining Physician to the Free Hospital for Poor Consumptives. 732 Pine St.

1895. Cross, William A., M.D., Consulting Physician to the Jewish Hospital. Jenkintown, Pa.

1904. Cruice, John M., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital; Physician to the Medical Dispensary of the University Hospital and of St. Joseph's Hospital. 1815 Spruce St.

ELECTED

1902. Currie, Charles A., M.D., Physician to the Germantown Hospital. West Walnut Lane, Germantown.

1884. Curtin, Roland Gideon, A.M., M.D., Ph.D., Physician Emeritus to the Philadelphia Hospital; Physician to the Presbyterian Hospital; President of the American Society of Tropical Medicine; President of the Philadelphia Medical Club. 22 S. Eighteenth St.

1884. Da Costa, John C., M.D., Emeritus Gynecologist to the Jefferson Medical College Hospital; Consulting Gynecologist to St. Agnes's Hospital. 1022 Spruce St.

1903. Da Costa, John C., Jr., M.D., Demonstrator of Clinical Medicine in the Jefferson Medical College; Chief of the Medical Clinic in the Jefferson Medical College Hospital; Assistant Physician to the Philadelphia Hospital; Hæmatologist to the German Hospital. 1022 Spruce St.

1896. Da Costa, John Chalmers, M.D., Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Surgeon to the Philadelphia and to St. Joseph's Hospitals. 2045 Walnut St.

1887. Daland, Judson, M.D., Professor of Clinical Medicine in the Medico-Chirurgical College; Physician to the Medico-Chirurgical Hospital; Consulting Physician to the Kensington Hospital for Women; Consulting Physician to the State Hospital for the Insane at Norristown. 317 S. Eighteenth St.

1859. Darrach, James, M.D., Consulting Surgeon to the Germantown Hospital. 5923 Green St., Germantown.

1896. Davis, Charles N., M.D., Dermatologist to the Pennsylvania Hospital; Consulting Dermatologist to St. Agnes's Hospital; Assistant Physician in the Dispensary for Skin Diseases in the Howard Hospital. 1931 Spruce St.

1888. Davis, Edward P., A.M., M.D., Professor of Obstetrics in the Jefferson Medical College and in the Philadelphia Polyclinic; Visiting Obstetrician to the Jefferson and to the Polyclinic Hospitals; Obstetrician and Gynecologist to the Philadelphia Hospital; Member of the American Gynecological Society, the American Pediatric Society, and of the International Congress of Obstetrics and Gynecology. 250 S. Twenty-first St.

ELECTED

1889. Davis, Gwilym G., M.D. (Univ. of Penna. and Göttingen), M.R.C.S. England, Associate Professor of Applied Anatomy in the University of Pennsylvania; Surgeon to the Episcopal, to St. Joseph's, and to the Orthopædic Hospitals. 255 S. Sixteenth St.

1900. Davisson, Alex. Heron, M.D., Physician to the Dispensary of the Children's Hospital. 31 S. Paul's Road, Ardmore.

1894. Deaver, Harry C., M.D., Surgeon to the Episcopal and to St. Mary's Hospitals, and to St. Christopher's Hospital for Children. 1534 N. Fifteenth St.

1887. Deaver, John B., M.D., Surgeon-in-Chief to the German Hospital; Consulting Surgeon to the Germantown Hospital. 1634 Walnut St.

1892. Deaver, Richard Wilmot, M.D., Surgeon to the Germantown Hospital. 6105 Main Street, Germantown.

1902. Dehoney, Howard, M.D. 237 S. Thirteenth St.

1885. Dercum, Francis X., M.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College; Neurologist to the Philadelphia Hospital; Consulting Neurologist to St. Agnes's and to the Jewish Hospitals, and to the State Asylum for the Chronic Insane of Pennsylvania. 1719 Walnut St.

1891. Dixon, Samuel G., M.D., President and Executive Curator of the Academy of Natural Sciences of Philadelphia; Member of the Council of the American Philosophical Society; Member of the Board of Trustees of the Wistar Institute of Anatomy; Member of the Board of Managers of the Philadelphia Zoölogical Society. Ardmore, Pa.

*1896. Donnellan, P. S., M.D., L.R.C.S. and P., Ireland. Coronado Beach, Cal.

1897. Dorland, W. A. Newman, M.D., Associate in Gynecology in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Instructor in Obstetrics in the University of Pennsylvania. 126 S. Seventeenth St.

1902. Dougherty, Sherborne W., M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Physician to the Dispensary of the German Hospital; Assistant Physician to the Methodist Hospital. 256 S. Sixteenth St.

ELECTED

1893. Downs, Norton, M.D. 215 W. Walnut Lane, Germantown.

1864. Downs, R. N., M.D., Consulting Physician to the Germantown Hospital. 5916 Greene St., Germantown.

1902. Downs, Robert N., Jr., M.D., Surgeon to the Dispensary of the Germantown Hospital. 6008 Greene St., Germantown.

1864. Duer, Edward L., A.M., M.D., Gynecologist to the Presbyterian Hospital; Consulting Obstetrician to the Maternity Hospital and to the Preston Retreat. 1606 Locust St.

1897. Duer, S. Naudain, M.D., Physician to the Dispensary of the Presbyterian Hospital. 1916 Pine St.

1871. Duhring, L. A., M.D., Professor of Dermatology in the University of Pennsylvania. 3322 Walnut St.

1881. Dulles, Charles Winslow, M.D., Lecturer on the History of Medicine in the University of Pennsylvania; Consulting Surgeon of the Rush Hospital. 4101 Walnut St.

*1871. Dunglison, Thomas R., M.D. 80 Rue Victor Hugo, Rosny sous Bois (Seine), France.

*1860. Dunton, William R., M.D. Montrose, Pa.

1899. Edsall, David L., M.D., Assistant Professor of Medicine in the University of Pennsylvania; Woodward Fellow in Chemistry in the William Pepper Laboratory of Clinical Medicine; Physician to the Episcopal Hospital. 1432 Pine St.

*1887. Edwards, William A., M.D., Professor of Pediatrics in the Medical Department of the University of Southern California. Fourth and Spring Sts., Los Angeles, Cal.

1904. Elmer, Walter G., M.D., Surgeon to the Out-patient Department of the Presbyterian Hospital; Instructor in Orthopedic Surgery in the University of Pennsylvania; Assistant Orthopedic Surgeon to the University Hospital; Consulting Physician to the Church Home for Children. 1801 Pine St.

1896. Ely, Thomas C., A.M., M.D. 2041 Green St.

1901. Erck, Theodore A., M.D., Assistant Surgeon to the Gynecean Hospital; Associate in Gynecology in the Philadelphia Polyclinic and College for Graduates in Medicine; Gynecologist to the Frederick Douglass Memorial Hospital. 251 S. Thirteenth St.

ELECTED

1893. Eshner, Augustus A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic and College for Graduates in Medicine; Physician to the Philadelphia Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Physician to the Hospital for Diseases of the Lungs, Chestnut Hill. 1019 Spruce St.

1868. Evans, Horace Y., A.M., M.D. 1631 Green St.

1905. Evans, Joseph S., Jr., M.D., Registrar to the Professor of Medicine in the University Hospital; Assistant Physician to the Philadelphia Hospital; Associate in the William Pepper Laboratory of Clinical Medicine; Instructor in Clinical Medicine in the University of Pennsylvania. 318 S. Fifteenth St.

1905. Evans, William, M.D. 4009 Chestnut St.

1894. Faries, Randolph, M.D. 2007 Walnut St.

1903. Farr, Clifford B., M.D., Physician to the Methodist Hospital; Instructor in Physical Diagnosis in the University of Pennsylvania; Instructor in Diseases of the Stomach in the Philadelphia Polyclinic; Assistant Physician in the Medical Dispensary of the Hospital of the University of Pennsylvania. 326 S. Seventeenth St.

1893. Farr, William W., M.D., Physician to the Leamy Home. 117 Allen's Lane, Mount Airy.

1884. Fenton, Thomas H., M.D., Medical Director and Senior Ophthalmologist to the Union Mission Hospital; Ophthalmologist to St. Vincent's Home, to the Home for Aged Couples, to the Baptist Home, and to the House of the Good Shepherd. 1319 Spruce St.

1884. Fisher, Henry M., M.D., Physician to the Out-patient Department of the Pennsylvania Hospital. 1027 Pine St.

*1900. Flexner, Simon, M.D., Director of the Rockefeller Institute, New York City; Member of the Association of American Physicians; Corresponding Member of La Societa Medico-Chirurgica di Bologna. Rockefeller Institute, New York.

1888. Flick, Lawrence F., M.D. 736 Pine St.

*†1885. Fox, Joseph M., M.D., Leesburg, Va.

1906. Fraley, Frederick, Jr., A.B., M.D. 253 S. Thirteenth St.

ELECTED

1903. Francine, Albert P., A.M., M.D., Instructor in Medicine in the University of Pennsylvania; Physician to the Medical Dispensary of the University Hospital; Member of the Staff of Henry Phipps Institute; Medical Registrar to the Philadelphia Hospital. 218 S. Fifteenth St.

1897. Frazier, Charles H., M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, to the Philadelphia, and to the Episcopal Hospitals; Surgeon to the Home for Crippled Children. 1721 Spruce St.

†1890. Freeman, Walter J., M.D., Emeritus Professor of Laryngology in the Philadelphia Polyclinic; Laryngologist to the Orthopædic Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 1832 Spruce St.

1893. Friebis, George, M.D., Ophthalmic Surgeon to the Lutheran Home and Orphanage, Mt. Airy. 1906 Chestnut St.

1899. Furness, William H., 3d, M.D.

1889. Fussell, M. Howard, M.D., Assistant Professor of Medicine in the University of Pennsylvania; Physician to St. Timothy's Hospital; Physician to St. Mary's Hospital. 189 Green Lane, Manayunk.

1899. Gamble, Robert G., M.D., one of the Attending Physicians to the Bryn Mawr Hospital. Haverford, Pa.

1873. Gerhard, George S., M.D., Physician-in-Chief to the Bryn Mawr Hospital; Consulting Physician to Bryn Mawr College; Consulting Physician to Villa Nova College. Fifty-eighth Street and Overbrook Ave.

1864. Getchell, F. H., M.D. 1432 Spruce St.

1902. Ghriskey, Albert A., M.D., Clinical Pathologist to the Episcopal Hospital. 3936 Walnut St.

1892. Gibb, Joseph S., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Surgeon to the Ear, Nose and Throat Department of the Episcopal Hospital. 1907 Chestnut St.

1899. Gibbon, John H., M.D., Surgeon to the Pennsylvania Hospital; Surgeon to the Bryn Mawr Hospital; Consulting Surgeon to the Woman's Hospital; Associate Professor of Surgery in the Jefferson Medical College. 1608 Spruce St.

ELECTED

1897. Girvin, John H., M.D., Physician for Diseases of Women at the Presbyterian Hospital; Instructor in Obstetrics in the University of Pennsylvania. 3924 Walnut St.

1889. Githens, William H. H., M.D., Visiting Physician to the Sheltering Arms. 1337 Pine St.

1906. Gittings, J. Claxton, M.D., Visiting Physician to the Children's Hospital of the Mary J. Drexel Home, and to the Medical Dispensary of the Children's Hospital; Assistant Physician to the Medical Dispensary of the German Hospital; Assistant Pediatric Physician to the University Hospital, and Assistant Instructor in Pedriatics in the University of Pennsylvania. 3942 Chestnut St.

1905. Givin, Ellis E. W., M.D., Assistant Surgeon to the Jewish Maternity Hospital; Surgeon to the Dispensary of the Episcopal Hospital; Surgeon to the Dispensary of St. Christopher's Hospital for Children. 2714 Columbia Ave.

1894. Gleason, E. B., M.D., Clinical Professor of Otology in the Medico-Chirurgical College; Surgeon-in-Charge of the Nose, Throat, and Ear Department of the Northern Dispensary. 2033 Chestnut St.

1884. Godey, Harry, M.D. Aldine Hotel.

1906. Goepp, R. Max, M.D., Professor of Clinical Medicine and Dean of the Philadelphia Polyclinic and College for Graduates in Medicine. 332 S. Fifteenth St.

1906. Goldberg, Harold G., M.D., Pathologist and Curator to the Wills Eye Hospital. 1733 Chestnut St.

1893. Goodell, W. Constantine, M.D. 300 S. Thirteenth St.

1905. Gordon, Alfred, M.D., Associate in Nervous and Mental Diseases in the Jefferson Medical College; Examiner of the Insane at the Philadelphia Hospital. 1430 Pine St.

†1897. Gould, George M., A.M., M.D. 1722 Walnut St.

1894. Graham, Edwin E., M.D., Professor of Pediatrics in the Jefferson Medical College; Pediatrist to the Jefferson and to the Philadelphia Hospitals; Physician to the Franklin Reformatory Home. 1713 Spruce St.

1885. Graham, John, M.D. 326 S. Fifteenth St.

1904. Grayson, Charles P., M.D., Clinical Professor of Laryngology and Rhinology in the University of Pennsylvania; Physician-in-Charge of Throat and Nose Department of

ELECTED

the University Hospital; Otolaryngologist to the Philadelphia Hospital. 251 S. Sixteenth St.

1883. Griffith, J. P. Crozer, M.D., Clinical Professor of the Diseases of Children in the University of Pennsylvania; Physician to St. Agnes's, to the Children's, and to the Methodist Hospitals. 1810 Spruce St.

*1889. Gutiéras, John, M.D. Havana, Cuba.

1902. Gwyn, Norman B., M.B., Instructor in Medicine in the University of Pennsylvania. 23 S. Twenty-first St.

*1893. Hamill, Robert H., M.D., Summit, N. J.

1894. Hamill, Samuel McC., M.D., Professor of Diseases of Children in the Philadelphia Polyclinic and College for Graduates in Medicine; Pediatrist to the Howard Hospital. 1822 Spruce St.

1897. Hand, Alfred, Jr., M.D., Visiting Physician to the Children's Hospital, Children's Hospital of the Mary J. Drexel Home of Philadelphia, and to the Methodist Hospital. 1724 Pine St.

1886. Hansell, Howard F., M.D., Professor of Ophthalmology in the Jefferson Medical College; Ophthalmic Surgeon to the Philadelphia Hospital and to the Jefferson Medical College Hospital; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic. 1528 Walnut St.

1889. Hare, Hobart A., M.D., Professor of Therapeutics in the Jefferson Medical College; Physician to the Jefferson Medical College Hospital. 1801 Spruce St.

1865. Harlan, George C., M.D., Consulting Surgeon to the Wills Eye Hospital; Ophthalmologist to the Pennsylvania Hospital; Consulting Ophthalmologist to the Pennsylvania Institution for the Blind, and to the Pennsylvania Institution for the Deaf. 1700 Walnut St.

1902. Harland, William G. B., M.D., Instructor in Laryngology in the University of Pennsylvania; Instructor in Otology in the Philadelphia Polyclinic; Laryngologist to the Henry Phipps Institute for Tuberculosis, and to the Philadelphia Home for Incurables. 223 S. Seventeenth St.

1903. Hart, Charles D., M.A., M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Inspector of the Eastern Penitentiary. 1713 Walnut St.

ELECTED

1885. Harte, Richard H., M.D., Adjunct Professor of Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania and to the Orthopædic Hospitals; Consulting Surgeon to St. Mary's, to St. Timothy's, and to the Bryn Mawr Hospitals. 1503 Spruce St.

1888. Hartzell, Milton B., M.D., Associate in Dermatology in the University of Pennsylvania; Dermatologist to the Methodist Episcopal Hospital. 3644 Chestnut St.

1872. Hays, I. Minis, M.D. 266 S. Twenty-first St.

1882. Hearn, W. Joseph, M.D., Professor of Clinical Surgery in the Jefferson Medical College; Surgeon to the Philadelphia Hospital. 1120 Walnut St.

1901. Heisler, John C., M.D., Professor of Anatomy in the Medico-Chirurgical College. 3829 Walnut St.

1884. Henry, Frederick P., M.D., Physician to the Philadelphia Hospital; Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania. 1635 Locust St.

1903. Henry, J. Norman, M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Assistant Physician to the Philadelphia Hospital; Clinical Instructor in Medicine in the Woman's Medical College of Pennsylvania; Physician-in-Charge of the DeLancey School. 252 S. Sixteenth St.

1891. Hewson, Addinell, A.M., M.D., Professor of Anatomy in the Philadelphia Polyclinic and College for Graduates in Medicine; Surgeon to St. Timothy's Hospital, Roxborough. 2120 Spruce St.

1872. Hinkle, A. G. B., M.D. 1300 Spring Garden St.

1897. Hinkle, William M., M.D., Lecturer on the Anatomy and Physiology of the Vocal Organs in the National School of Elocution and Oratory. 1323 N. Thirteenth St.

*1892. Hinsdale, Guy, A.M., M.D., Secretary of the American Climatological Association; Corresponding Member of the British Balneological and Climatological Society; Vice-president of the American Academy of Medicine; Lecturer on Climatology in the Medico-Chirurgical College, Philadelphia. Hot Springs, Va.

ELECTED

1888. Hirsh, A. Bern., M.D., Physician to the Home for Aged Couples. 1711 Diamond St.

1888. Hirst, Barton Cooke, M.D., Professor of Obstetrics in the University of Pennsylvania; Gynecologist to the Philadelphia and to the Howard Hospitals. 1821 Spruce St.

1903. Hirst, John Cooke, M.D., Assistant Obstetrician to the University and the Philadelphia Hospitals; Attending Physician to the Maternity Hospital and to the Gynecological Dispensary of the Howard Hospital; Consulting Obstetrician to the Southeastern Dispensary. 1618 Pine St.

*1894. Hoch, William R., M.D. 108-109 Central Block, Pueblo, Col.

1905. Hodge, Edward B., Jr., M.D., Surgeon to the Out-patient Department of the Pennsylvania Hospital; Assistant Surgeon to the Orthopædic Hospital; Dispensary Surgeon to the Presbyterian Hospital; Dispensary Surgeon to the Children's Hospital. 346 S. Sixteenth St.

1885. Holland, James W., M.D., Professor of Medical Chemistry and Toxicology in the Jefferson Medical College. 2006 Chestnut St.

1906. Holloway, Thomas B., M.D., Assistant Surgeon to the Dispensary for Diseases of the Eye at the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital; Registrar of the Ophthalmic Wards of the Philadelphia Hospital; Ophthalmologist to the Philadelphia Orphanage. 2049 Chestnut St.

1888. Horwitz, Orville, M.D., Professor of Genito-Urinary Surgery in the Jefferson Medical College; Surgeon to the Jefferson Medical College Hospital, to St. Agnes's Hospital, and to the State Hospital for the Insane; Consulting Surgeon to the Jewish Hospital. 1721 Walnut St.

1892. Hughes, William E., M.D., Visiting Physician to the Philadelphia Hospital; Pathologist to the Presbyterian Hospital. 3945 Chestnut St.

1898. Hutchinson, James P., M.D., Surgeon to the Pennsylvania, to the Methodist, to the Children's, to St. Timothy's, and to the Bryn Mawr Hospitals; Adjunct Professor of Surgery in the University of Pennsylvania. 1702 Locust St.

1871. Ingham, James V., M.D. 1811 Walnut St.

ELECTED

*1885. Jackson, Edward, M.D., Professor of Ophthalmology in the University of Colorado; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic; Ophthalmologist to the Denver City and County Hospital. McPhee Building, Denver, Col.

1906. Jacobs, Francis Brinton, B.S., M.D., Visiting Physician to the Philadelphia Orphan Asylum; Pediatrist to the American Hospital for Diseases of the Stomach; Assistant in the Laboratory of the Polyclinic Hospital, 334 S. Nineteenth St.

1887. Jayne, Horace, M.D., Ph.D. 318 S. Nineteenth St.

1898. Johnson, Russell H., A.B. (Princeton), M.D., Physician to the Pennsylvania Institution for the Deaf and Dumb. Chestnut Hill, Philadelphia.

1900. Jones, Charles James, A.M., M.D., Ophthalmic Surgeon to the House of the Good Shepherd, Germantown; Assistant Surgeon to the Wills Eye Hospital. 1009 North Sixth St.

1900. Jopson, John H., M.D., Surgeon to the Children's, to the Presbyterian, and to the Bryn Mawr Hospitals, and to the Philadelphia Home for Incurables. 334 S. Sixteenth St.

1885. Judd, Leonardo da Vinci, M.D. 3603 Powelton Ave.

1900. Judson, Charles F., A.B., M.D., Physician to St. Christopher's Hospital for Children, to the Southern Home for Destitute Children and to the Sheltering Arms. 1539 Pine St.

1902. Jump, Henry D., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Medical Dispensary of the University Hospital. Forty-seventh Street and Chester Ave.

1886. Jurist, Louis, M.D. 916 N. Broad St.

1903. Kalteyer, Frederick J., M.D., Demonstrator of Clinical Medicine in the Jefferson Medical College; Chief of the Out-patient Department, Assistant Attending Physician and Hæmatologist to the Jefferson Medical College Hospital; Pathologist to the Philadelphia Lying-in-Charity. 214 S. Fifteenth St.

1904. Kane, J. A. Bayard, M.D. 211 S. Seventeenth St.

†1867. Keen, William W., M.D., LL.D., (Hon.) F.R.C.S. (Eng. and Edin.), Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Membre Corre-

ELECTED

spondant Étranger de la Société de Chirurgie de Paris; Honorary Member of the Société Belge de Chirurgie and of the Clinical Society of London; Ehrenmitglied der Deutschen Gesselschaft für Chirurgie. 1729 Chestnut St.

1897. Kelly, Aloysius O. J., A.M., M.D., Assistant Professor of Medicine in the University of Pennsylvania; Professor of the Theory and Practice of Medicine in the University of Vermont; Professor of Pathology in the Woman's Medical College of Pennsylvania; Pathologist to the German Hospital; Physician to St. Agnes' Hospital. 1911 Pine St.

*1887. Kelly, Howard A., M.D., Professor of Gynecology in Johns Hopkins University and Gynecologist to the Johns Hopkins Hospital, Baltimore, Md. 1406 Eutaw Place, Baltimore, Md.

1898. Kempton, Augustus F., M.D. 2118 Pine St.

1905. Kercher, Delno E , M.D. 1927 S. Eighteenth St.

1902. King, William Howard, M.D. 6315 McCallum St.

1895. Kneass, Samuel S., M.D., Associate in the William Pepper Laboratory of Clinical Medicine in the University of Pennsylvania. 1510 Walnut St.

1904. Krauss, Frederick, M.D., Ophthalmic Surgeon to St. Christopher's Hospital for Children and Dispensary; Instructor in Ophthalmology in the Philadelphia Polyclinic. 930 N. Franklin St.

1905. Kremer, Walter H., M.D. 6122 Main St., Germantown.

1900. Krusen, Wilmer, M.D., Instructor in Gynecology in Jefferson Medical College; Assistant Gynecologist and Chief of the Gynecological Dispensary of St. Joseph's Hospital; Consulting Gynecologist to the Children's Hospital in Germantown. 127 N. Twentieth St.

1897. Kyle, D. Braden, A.M., M.D., Professor of Laryngology in the Jefferson Medical College; Consulting Laryngologist, Rhinologist, and Otologist to St. Agnes's Hospital and to the Philadelphia Home for Incurables; Laryngologist to the New Jersey Training School for Feeble-minded Children; Bacteriologist to the Orthopedic Hospital and Infirmary for Nervous Diseases. 1517 Walnut St.

*1865. La Roche, C. Percy, M.D. 1518 Pine St.

*1892. Laine, Damaso T., M.D., Havana, Cuba.

ELECTED

1904. Landis, Henry R. M., M.D., Visiting Physician to the White Haven Sanatorium; Member of the Staff of the Henry Phipps Institute; Assistant Visiting Physician to the Philadelphia Hospital. 130 S. Twenty-third St.

1904. Le Boutillier, Theodore, M.D., Physician to the Dispensary of St. Christopher's Hospital for Children; Instructor in Diseases of Children in the Philadelphia Polyclinic; Registrar to the Medical Dispensary of the Children's Hospital; Visiting Physician to the Baptist Orphanage and Haddock Memorial Home. 216 Twentieth St.

1893. Le Conte, Robert G., A.B., M.D., Surgeon to the Pennsylvania, to the Children's and to the Bryn Mawr Hospitals; Consulting Surgeon to the Germantown Hospital. 1530 Locust St.

1887. Leaman, Henry, M.D. 832 N. Broad St.

1903. Leffmann, Henry, A.M., M.D., D.D.S., Ph.D., Professor of Chemistry and Toxicology in the Woman's Medical College of Pennsylvania; Professor of Chemistry in the Wagner Free Institute of Science; Pathological Chemist to the Jefferson Medical College Hospital; Chemist to the State Board of Health of Pennsylvania. 39 S. Tenth St.

1892. Leidy, Joseph, M.D., Consulting Physician to the Pennsylvania Training School for Feeble-minded Children. 1319 Locust St.

1903. Leonard, Charles Lester, M.D. 112 S. Twentieth St

1877. Lewis, Morris J., M.D., Physician to the Orthopedic Hospital and Infirmary for Nervous Diseases and to the Pennsylvania Hospital. 1316 Locust St.

1904. Lindauer, Eugene, M.D., Instructor in Clinical Medicine in the Philadelphia Polyclinic. 2018 N. Thirty-second St.

1886. Lloyd, J. Hendrie, M.D., Neurologist to the Philadelphia Hospital; Physician to the Methodist Episcopal Hospital, and to the Home for Crippled Children; Consulting Neurologist to the State Asylum for the Chronic Insane of Pennsylvania and to the Pennsylvania Training School for Feeble-minded Children. 3918 Walnut St.

1900. Lodge, John W., M.D., Consulting Physician to the Bryn Mawr Hospital. Merion, Pa.

ELECTED

1893. Longaker, Daniel, M.D., Surgeon to the Jewish Maternity Hospital. 1402 N. Sixteenth St.

1906. Longcope, Warfield T., M.D., Director of the Ayer Clinical Laboratory of the Pennsylvania Hospital; Instructor in Medicine in the University of Pennsylvania. 251 S. Seventeenth St.

1877. Longstreth, Morris, M.D., 1416 Spruce St.

1900. McCarthy, Daniel J., M.D., Instructor in Neurology in the Philadelphia Polyclinic; Associate of the William Pepper Laboratory of Clinical Medicine. 1329 Spruce St.

1875. McClellan, George, M.D., Consulting Surgeon to the Howard Hospital. 1116 Spruce St.

*1903. McConnell, Guthrie, M.D., Bacteriologist to the Missouri State Board of Health; Pathologist to the St. Louis Skin and Cancer Hospital, and to St. Luke's Hospital. 4421 Berlin Ave., St. Louis, Mo.

1895. McFarland, Joseph, M.D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College; Pathologist to the Medico-Chirurgical and the Philadelphia Hospitals. 442 W. Stafford St., Germantown.

1906. McKee, James H., M.D., Clinical Professor of Pediatrics in the Woman's Medical College of Pennsylvania; Professor of Diseases of Children in the Philadelphia Polyclinic; Pediatrist to the Philadelphia Hospital. 1519 Poplar St.

1905. McKenzie, Robert Tait, A.B., M.D., Professor of Physical Education and Director of the Department of Physical Education in the University of Pennsylvania. 121 S. Eighteenth St

1900. McReynolds, Robert Phillips, M.D., one of the Resident Chiefs and one of the Chiefs of the Gynecological Dispensary of the Presbyterian Hospital. 3722 Walnut St.

1886. MacCoy, Alexander W., M.D., Surgeon for Diseases of the Nose and Throat in the Out-patient Department of the Pennsylvania Hospital; Member of the American Laryngological Society. 216 S. Fifteenth St.

1905. MacIntosh, James W., M.D. Fifty-second and Jefferson Streets.

ELECTED

1901. MacLeod, George I., Jr., M.D., Physician to the Bryn Mawr Hospital; Assistant Physician to Bryn Mawr College. Ardmore, Pa.

1896. Makuen, G. Hudson, M.D., Professor of Defects of Speech in the Philadelphia Polyclinic; Laryngologist to St. Mary's Hospital and to the Frederick Douglass Memorial Hospital; Visiting Consultant on Defects of Speech to the New Jersey Training School for Feeble-minded Children. 1627 Walnut St.

*1885. Mallet, John William, M.D., Ph.D. (Goett.), LL.D. (Princeton and Johns Hopkins), F.R.S., Professor of Chemistry in the University of Virginia. University of Virginia, Charlottesville, Va.

1898. Marshall, George Morley, M.D., Laryngologist to the Philadelphia Hospital; Physician and Laryngologist to St. Joseph's Hospital. 1819 Spruce St.

1893. Marshall, John, M.D., Nat. Sc. D., LL.D., Professor of Chemistry and Toxicology in the University of Pennsylvania. 1718 Pine St.

1889. Martin, Edward, M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to University, Howard, Philadelphia, and Bryn Mawr Hospitals. 1506 Locust St.

1885. Mays, Thomas J., M.D., Visiting Physician to the Rush Hospital. 1829 Spruce St.

*1868. Mears, J. Ewing, M.D. 1535 Land Title Building, Broad and Sansom Sts.

1875. Meigs, Arthur V., M.D., Physician to the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Institution for the Instruction of the Blind. 1322 Walnut St.

*1884. Mifflin, Houston, M.D., Columbia, Pa.

1894. Miller, D. J. Milton, M.D., Visiting Physician to the Episcopal and to the Children's Hospitals. 1801 Pine St.

1881. Mills, Charles K., M.D., Professor of Neurology in the University of Pennsylvania; Neurologist to the Philadelphia Hospital; Consultant to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1909 Chestnut St.

1904. Mitchell, Charles F., M.D., Surgeon to the Germantown Hospital and to the Out-patient Department of the Pennsylvania Hospital; Assistant Surgeon to the Orthopædic

ELECTED

Hospital and Infirmary for Nervous Diseases; Associate in Surgery in the Philadelphia Polyclinic. 251 S. Seventeenth St.

†1888. Mitchell, John K., M.D., Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Neurologist to the Presbyterian Hospital; Attending Physician to the Pennsylvania Training School for Feeble-minded Children. 1730 Spruce St.

1856. Mitchell, S. Weir, M.D., M. Nat. Ac. Sci., LL.D. (Edinburgh), Corresponding Member of French Academy of Medicine; Assembly für innere Medicin, Berlin; Member of the Royal Medical Society. 1524 Walnut St.

1882. Montgomery, Edward E., M.D., Professor of Gynecology in the Jefferson Medical College; Gynecologist to the Jefferson Medical College Hospital and to St. Joseph's Hospital. 1703 Walnut St.

1886. Morris, Caspar, M.D. 2050 Locust St.

1893. Morris, Elliston J., M.D., Physician to the Episcopal Hospital and to the Midnight Mission. 128 S. Eighteenth St.

1883. Morris, Henry, M.D., Professor of Anatomy in the Woman's Medical College of Pennsylvania; Senior Visiting Physician to St. Joseph's Hospital; Associate Member, Military Surgeons of U. S. A. 313 S. Eighteenth St.

1856. Morris, J. Cheston, M.D. 1514 Spruce St.

1906. Morrison, William H., M.D., Surgeon to the Frankford Hospital. 8021 Frankford Ave.

1897. Morton, Samuel W., M.D. 1933 Chestnut St.

1891. Morton, Thomas S. K., M.D. School Lane, Germantown.

1864. Moss, William, M.D. Chestnut Hill.

1904. Moulton, Albert R., M.D., Senior Assistant Physician to the Pennsylvania Hospital for the Insane; Physician to the Out-patient Department for Nervous and Mental Diseases at the Pennsylvania Hospital; Professor of Mental Diseases in the Maine Medical School (Bowdoin College). Pennsylvania Hospital for the Insane.

1905. Müller, George P., M.D., Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon to the Philadelphia Hospital; Assistant Surgeon to the Home for Crippled Children; Assistant Pathologist to the German Hospital. 314 S. Fifteenth St.

ELECTED

1882. Musser, John H., M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the University, the Philadelphia, and the Presbyterian Hospitals. 1927 Chestnut St.

1905. Mutschler, Louis H., M.D., Surgeon to the Dispensary of the Episcopal Hospital; Surgeon to the Dispensary of St. Christopher's Hospital for Children; Assistant Surgeon to the Orthopædic Hospital. 2030 Tioga St.

1896. Myers, T. D., M.D., Lecturer on Ophthalmology in the U. S. Navy Medical School; Special Consultant in Diseases of the Eye at the U. S. Naval Academy. 1521 Spruce St.

1902. Nassau, Charles F., M.D., Surgeon to St. Joseph's Hospital; Physician to Dispensary for Women of the German Hospital. 1720 Chestnut St.

1886. Neff, Joseph S., M.D. 2031 Spruce St.

1887. Neilson, Thomas Rundle, A.M.,M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Clinical Professor of Genito-Urinary Diseases in the University of Pennsylvania. 122 S. Seventeenth St.

1905. Newcomet, William S., M.D. 3501 Baring St.

1905. Newlin, Arthur, M.D., Physician to the Dispensary of the Children's Hospital; Assistant Physician to the Orthopædic Hospital. 253 S. Thirteenth St.

1899. Nicholson, William R., Jr., M.D., Assistant Instructor in Obstetrics in the University of Pennsylvania; Obstetrician to Maternity Hospital; Assistant Surgeon to Gynecean Hospital. 350 S. Fifteenth St.

1889. Noble, Charles P., M.D., Surgeon-in-Chief to the Kensington Hospital for Women; Surgeon-in-Charge of the Department for Women of the Northern Dispensary and of the Union Mission Hospital; Clinical Professor of Gynecology in the Woman's Medical College of Pennsylvania; Lecturer on Gynecology in the Philadelphia Polyclinic. 1509 Locust St.

*1893. Noble, William H., M.D. Western Maryland Hospital, Cumberland, Md.

1898. Nolan, Edward J., M.D., Recording Secretary and Librarian of the Academy of Natural Sciences of Philadelphia. 825 N. Twentieth St.

ELECTED

1905. Norris, Charles C., M.D., Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist to the Philadelphia and to the Howard Hospitals. 1503 Locust St.

1905. Norris, George William, A.B., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital; Physician to the Henry Phipps Institute for the Study, Prevention and Treatment of Tuberculosis; Physician to the Dispensary of the Episcopal Hospital. 1530 Locust St.

*1901. Norris, Henry, M.D., Rutherfordton, N. C.

†1865. Norris, Isaac, M.D. "Fair Hill," Bryn Mawr.

1892. Norris, Richard C., M.D., Lecturer on Clinical and Operative Obstetrics in the University of Pennsylvania; Obstetrician in Charge to the Preston Retreat; Visiting Obstetrician to the Philadelphia Hospital; Gynecologist to the Methodist Hospital and Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital. 500 North Twentieth St.

1884. Oliver, Charles A., A.M., M.D., Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to the Philadelphia and to the Presbyterian Hospitals; Clinical Professor of Ophthalmology in the Woman's Medical College of Pennsylvania. 1507 Locust St.

1884. O'Neill, J. Wilks, M.D. 2110 Spruce St.

*1885. Osler, William, M.D., Regius Professor of Medicine in Oxford University, England. No. 7, Norman Gardens, Oxford, England.

1903. Ostheimer, Maurice, M.D., Instructor in Pediatrics in the University of Pennsylvania; Physician to the Medical Dispensary of St. Christopher's Hospital for Children; Registrar to the Medical Dispensary of the Children's Hospital. 225 S. Twentieth St.

1897. Packard, Francis R., M.D., Aurist to the Out-patient Department of the Pennsylvania Hospital; Professor of Diseases of the Ear in the Philadelphia Polyclinic and College for Graduates in Medicine; Consulting Aurist to the Bryn Mawr Hospital; Southeast corner of Nineteenth and Pine Sts.

ELECTED

1858. Packard, John H., M.D., Late Surgeon to the Pennsylvania Hospital; Surgeon Emeritus to St. Joseph's Hospital. 517 Chestnut St.

1898. Page, Henry F., M.D., Assistant Physician to the German Hospital and Physician to the Medical Dispensary of the same; Instructor in Clinical Medicine in the Woman's Medical College of Pennsylvania; Physician to the Baptist Home. 1907 Girard Avenue.

1906. Pancoast, Henry K., M.D., Lecturer on Skiagraphy in the University of Pennsylvania; Skiagrapher to the University Hospital. 3211 Baring Street.

1899. Parke, William E., M.D., Assistant Surgeon in the Department for Diseases of Women in the Northern Dispensary; Clinical Assistant and Surgeon to the Dispensary of the Kensington Hospital for Women. 1739 N. Seventeenth St.

1906. Parker, Frank C., M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to the Charity Hospital, Norristown; Ophthalmologist to the State Hospital for the Insane at Norristown; Radiographer to Charity Hospital, Norristown. 131 W. Main St., Norristown, Pa.

*1903. Pearce, Richard M., M.D., Director of the Bender Laboratory, Albany, N. Y.; Professor of Pathology in the Albany Medical School; Director of the Bureau of Pathology and Bacteriology of the New York State Board of Health. Albany, N. Y.

†1889. Penrose, Charles Bingham, M.D., Ph.D. (Harvard), Formerly Professor of Gynecology in the University of Pennsylvania. 1720 Spruce St.

1854. Penrose, R. A. F., M.D., LL.D., Professor (Emeritus) of Obstetrics and Diseases of Women and Children in the University of Pennsylvania. 1331 Spruce St.

†1902. Pepper, William, M.D., Instructor in Medicine in the University of Pennsylvania. 1811 Spruce St.

1884. Perkins, Francis M., M.D., Ophthalmic Surgeon to St. Agnes' Hospital. 1428 Pine St.

1905. Pfahler, George E., M.D., Director of the Röntgen Ray Laboratory, and Assistant Physician to the Medico-Chirurgical Hospital; Lecturer on Medical Terminology and

ELECTED

Symptomatology, and Demonstrator of Physical Diagnosis in the Medico-Chirurgical College. 1409 Spruce St.

*1899. Phillips, John L., M.D. The Bellefield, Pittsburgh, Pa.

1883. Piersol, George A., M.D., Professor of Anatomy in the University of Pennsylvania. 4722 Chester Ave.

1905. Pitfield, Robert L., M.D., Pathologist to the Germantown Hospital; Bacteriologist to the Chestnut Hill Hospital for Lung Diseases. 5211 Wayne Ave.

1896. Posey, William Campbell, M.D., Surgeon to the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmic Surgeon to the Howard Hospital; Ophthalmologist to the Pennsylvania Hospital for Epilepties. 1835 Chestnut St.

1902. Potts, Barton H., M.D., Laryngologist and Aurist to the German and to St. Mary's Hospitals; Assistant Aural Surgeon and Chief of the Ear Dispensary of the Children's Hospital; Laryngologist to the Pennsylvania Training School for Feeble-minded Children. 109 S. Twentieth St.

1899. Potts, Charles S., M.D., Associate in Neurology in the University of Pennsylvania; Assistant Neurologist to the University Hospital; Neurologist to the Philadelphia Hospital; Consulting Physician to the Hospital for the Insane, Atlantic County, New Jersey. 1728 Chestnut St.

1905. Prendergast, Michael T., M.D. 2435 Columbia Ave.

†1899. Price, Joseph, M.D., Obstetric Physician to the Philadelphia Dispensary. 241 N. Eighteenth St.

1903. Purves, George Morehouse, M.D., Registrar of the Surgical Dispensary of the Hospital of the University of Pennsylvania. 4204 Walnut St.

1903. Pyle, Walter L., M.D., Assistant Surgeon to the Wills Eye Hospital. 1806 Chestnut St.

1887. Randall, B. Alexander, M.A., M.D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania; Ear Surgeon to the Children's Hospital; Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb and to St. Timothy's Hospital. 1717 Locust St.

ELECTED

1904. Ravenel, Mazyck P., M.D., Assistant Medical Director and Attending Physician to the Henry Phipps Institute. 908 Pine St.

1887. Reed, Charles H., M.D. 121 S. Seventeenth St.

1885. Reichert, Edward T., M.D., Professor of Physiology in the University of Pennsylvania. University of Pennsylvania.

1897. Rhein, John H. W., M.D., Neurologist to the Howard Hospital; Physician to the Philadelphia Home for Incurables; Bacteriologist to the Pennsylvania Training School for Feeble-minded Children. 1732 Pine St.

1906. Rhein, Robert D., M.D., Assistant in the Department of General Medicine at the Howard Hospital. 2016 Pine St.

1891. Rhoads, Edward G., M.D. 159 W. Coulter St., Germantown.

1898. Riesman, David, M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic; Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia and to the Jewish Hospitals. 1624 Spruce St.

1895. Ring, G. Oram, A.M., M.D., Ophthalmic Surgeon to the Episcopal Hospital; Ophthalmologist to the Widener Memorial Home for Crippled Children; Consulting Ophthalmologist to the American Oncologic Hospital. 1901 Chestnut St.

1905. Risley, J. Norman, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmologist to the Pennsylvania Training School for Feeble-minded Children. 1728 Chestnut St.

1891. Risley, S. D., M.D., Attending Surgeon to the Wills Eye Hospital; Professor (Emeritus) of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Member of the Board of Managers of the Pennsylvania Training School for Feeble-minded Children; Alumnus Manager of the University Hospital. 1728 Chestnut St.

†1878. Roberts, John B., M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Methodist Hospital. 313 S. Seventeenth St.

1899. Roberts, Walter, M.D., Instructor in Otology in the Philadelphia Polyclinic; Clinical Assistant for Diseases of the Nose and Throat in the Out-patient Department of the Pennsylvania Hospital; Laryngologist to the Philadelphia Hospital. 33 S. Nineteenth St.

ELECTED

1903. Robertson, William Egbert, M.D., Assistant Visiting Physician and Chief of Dr. Daland's Clinic in the Medico-Chirurgical Hospital; Lecturer to Nurses in the Medico-Chirurgical Hospital; Physician to the Episcopal Hospital. 320 S. Sixteenth St.

1902. Robinson, James Weir, M.D., Assistant Surgeon to the Presbyterian Hospital. 402 S. Broad St.

1903. Robinson, William Duffield, Ph.G., M.D. 2012 Mount Vernon St.

1900. Rodman, William L., M.D., Professor of the Principles of Surgery and Clinical Surgery in the Medico-Chirurgical College; Professor of the Principles and Practice of Surgery in the Woman's Medical College of Pennsylvania. 1904 Chestnut St.

1898. Ross, George G., M.D., Assistant Surgeon to the German Hospital and Surgeon to the Out-patient Department of the same; Surgeon to the Germantown Hospital. 1721 Spruce St.

1905. Rugh, James Torrance, M.D., Orthopedic Surgeon to the Methodist Hospital; Demonstrator of Orthopedic Surgery in the Jefferson Medical College; Assistant Orthopedist to the Jefferson Hospital; Assistant Orthopedist to the Philadelphia Hospital. 1616 Spruce St.

1897. Sailer, Joseph, M.D., Associate in Medicine in the University of Pennsylvania; Associate of the Pepper Clinical Laboratory of the University of Pennsylvania; Pathologist to the Pennsylvania Training School for Feeble-minded Children. 248 S. Twenty-first St.

1900. Sajous, Charles E. de M., M.D. 2043 Walnut St.

1905. Sartain, Paul J., M.D. 212 W. Logan Square.

1906. Saylor, Edwin S., M.D., Ophthalmologist to St. Timothy's Hospital. 2005 Chestnut St.

1899. Schamberg, Jay F., M.D., Professor of Dermatology and Infectious Eruptive Diseases in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Physician to the Municipal Hospital for Infectious Diseases. 1922 Spruce St.

1887. de Schweinitz, George E., M.D., Professor of Ophthalmology in the University of Pennsylvania; Ophthalmic Surgeon

ELECTED

to the Philadelphia Hospital; Consulting Ophthalmic Surgeon to the Philadelphia Polyclinic; Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1705 Walnut St.

1895. Scott, J. Alison, M.D., Adjunct Professor of Medicine in the University of Pennsylvania; Visiting Physician to the Pennsylvania Hospital; Physician to the Church Home for Children. 1834 Pine St.

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 255 S. Seventeenth St.

1897. Sharpless, William T., M.D., Physician to the Chester County Hospital, West Chester, Pa.

1906. Shields, William G., M.D., Demonstrator of Morbid Anatomy in the Medico-Chirurgical College; Assistant Pathologist to the Philadelphia Hospital; Assistant Physician to the Howard Hospital; Assistant Physician to the Jewish Hospital. 412 School House Lane.

1876. Shippen, Edward, A.M. (Princeton), M.D., Medical Director U. S. Navy (retired). 2039 Pine St.

1891. Shober, John B., A.M., M.D., Associate Gynecologist to the Gynecean Hospital; Gynecologist to the Howard Hospital; Obstetrician to the Philadelphia Hospital. 1731 Pine St.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Presbyterian Hospital and to the Pennsylvania Epileptic Hospital and Colony Farm; Consulting Surgeon to the Woman's Hospital of Philadelphia. 1831 Chestnut St.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms and to the Southern Home for Destitute Children; Assistant Physician to the German Hospital; Physician to the Out-patient Department of the German and the Pennsylvania Hospitals. 2011 Chestnut St.

†1896. Shoemaker, William T., M.D., Ophthalmic Surgeon to the Germantown Hospital; Assistant Ophthalmologist and a Chief of Clinic to the German Hospital; Dispensary Ophthalmic Surgeon to the Presbyterian Hospital; Oculist to Pennsylvania Institution for the Deaf and Dumb. 2031 Chestnut St.

ELECTED

1900. Shumway, Edward Adams, B.S., M.D., Instructor in Ophthalmology in the University of Pennsylvania, and Assistant Ophthalmic Surgeon to the University Hospital; Assistant Ophthalmologist to the Philadelphia Hospital; Assistant Ophthalmologist and a Chief of Clinic to the German Hospital; Ophthalmologist to the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis. 2007 Chestnut St.

1880. Simes, J. Henry C., M.D., Emeritus Professor of Genito-Urinary and Venereal Diseases in the Philadelphia Polyclinic. Bala, Pa.

1903. Sinclair, John Falconer, M.D., Physician to the Medical Dispensary of the Presbyterian Hospital; Physician to the Philadelphia Orphan Asylum and to the Presbyterian Orphanage; Physician to the Home of the Merciful Saviour for Crippled Children. 4103 Walnut St.

1872. Sinkler, Wharton, M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Neurologist to the State Asylum for the Chronic Insane of Pennsylvania. 1606 Walnut St.

1902. Siter, E. Hollingsworth, M.D., Instructor in Genito-urinary Diseases in the University of Pennsylvania; Genito-urinary Surgeon to the Philadelphia Hospital; Chief Surgeon to the Genito-Urinary Dispensary of the University Hospital; Surgeon to the Dispensary of the Children's Hospital. 2038 Locust St.

1904. Skillern, Penn Gaskill, M.D., 241 S. Thirteenth St.

1895. Slocum, Harris A., M.D., Professor of Gynecology in the Philadelphia Polyclinic; Gynecologist to St. Clement's Hospital for Epileptics. 1900 Chestnut St.

1904. Smith, Allen J., M.D., Professor of Pathology in the University of Pennsylvania; Pathologist to the University Hospital, to the Philadelphia Hospital and to the State Hospital for the Insane at Norristown, Pa. University of Pennsylvania.

1905. Smith, S. MacCuen, M.D., Professor of Otology in the Jefferson Medical College; Aurist and Laryngologist to the Germantown Hospital; Aurist to the Jewish Hospital. 1429 Spruce St.

ELECTED

1895. Spellissy, Joseph M., A.M., M.D., Surgeon to the Outpatient Department of the Pennsylvania Hospital; Visiting Surgeon to St. Joseph's and to the Methodist Episcopal Hospitals; Assistant Surgeon to the Orthopædic Department of the University Hospital. 110 S. Eighteenth St.

1897. Spiller, William G., M.D., Associate Professor of Neurology and Professor of Neuropathology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania; Professor of Nervous Diseases in the Philadelphia Polyclinic and College for Graduates in Medicine. 4409 Pine St.

1894. Stahl, B. Franklin, Ph.G., B.S., M.D., Instructor in Physical Diagnosis and Lecturer on Dietetics of the Sick in the University of Pennsylvania; Visiting Physician to the Philadelphia Hospital; Medical Director of St. Agnes's Hospital. 1727 Pine St.

1904. Stanton, William B., M.D., Physician to the Department of Tuberculosis, Philadelphia Hospital; Physician to the Henry Phipps Institute; Visiting Physician to the Free Hospital for Poor Consumptives, White Haven, Pa. 732 Pine St.

1875. Starr, Louis, M.D. 1818 S. Rittenhouse Sq.

1898. Steele, J. Dutton, M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Medical Dispensary of the University Hospital; Bacteriologist to the Presbyterian Hospital. Corner Fortieth and Locust Sts.

1892. Steinbach, Lewis W., M.D., Professor of Clinical and Operative Surgery in the Philadelphia Polyclinic; Visiting Surgeon to the Philadelphia and to the Jewish Hospitals. 1309 N. Broad St.

1884. Stelwagon, Henry W., M.D., Ph.D., Professor of Dermatology in the Jefferson Medical College; Dermatologist to the Philadelphia and to the Howard Hospitals; Associate Member of the Society of Dermatology and Syphilology of France and of Italy. 1634 Spruce St.

1895. Stengel, Alfred, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the University, to the Pennsylvania, and to the Philadelphia Hospitals. 1811 Spruce St.

1901. Stevens, Arthur A., M.D., Professor of Pathology in the Woman's Medical College of Pennsylvania; Lecturer on

ELECTED

Physical Diagnosis in the University of Pennsylvania; Physician to the Episcopal and St. Agnes's Hospitals. 314 S. Sixteenth St.

1902. Stewart, Francis T., M.D., Professor of Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; Surgeon to the Germantown Hospital; Assistant Surgeon to the Jefferson Medical College Hospital; Surgeon to the Out-patient Department of the Pennsylvania Hospital. 311 S. Twelfth St.

1898. Stout, George C., M.D., Professor of Otology in the Philadelphia Polyclinic and College for Graduates in Medicine; Laryngologist and Aurist to the Presbyterian Hospital, the Children's Aid Society, and to the William Penn Charter School. 1611 Walnut St.

1884. Stryker, Samuel S., M.D., Physician to the Presbyterian Hospital. 3833 Walnut St.

1900. Swan, John M., M.D., 3713 Walnut St.

1898. Sweet, William M., M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic; Demonstrator of Ophthalmology in the Jefferson Medical College; Assistant Ophthalmic Surgeon to the Jefferson Medical College Hospital and to the Philadelphia Hospital; Ophthalmologist to the Phœnixville Hospital. 1205 Spruce St.

1906. Tait, Thomas W., M.D., Ophthalmologist to St. Agnes' Hospital and to the Charity Hospital. 320 S. Fifteenth St.

1900. Talley, James Ely, A.B., M.D., Physician to the Out-patient Department of the Presbyterian Hospital; Assistant and Consulting Physician to the Country Branch of the Children's Hospital. 1927 Chestnut St.

1901. Taylor, J. Gurney, M.D., Physician to the Pennsylvania Institution for the Instruction of the Blind. 6041 Drexel Road, Overbrook, Pa.

1886. Taylor, John Madison, A.M. (Princeton), M.D., Editor *Monthly Cyclopædia of Practical Medicine;* Pediatric Physician to the Philadelphia Hospital; Assistant Physician to the Children's Hospital; Consulting Physician to the Elwyn, Pa., and to the Vineland, N. J., Training Schools for Feeble-minded Children. 1504 Pine St.

ELECTED

1887. Taylor, William J., M.D., Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to St. Agnes' Hospital; Consulting Surgeon to the West Philadelphia Hospital for Women. 1825 Pine St.

1886. Taylor, William L., M.D. 1340 N. Twelfth St.

1867. Thomas, Charles Hermon, M.D. 3634 Chestnut St.

1897. Thomson, A. G., M.D., Assistant Ophthalmic Surgeon to the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1426 Walnut St.

†1869. Thomson, William, M.D., Emeritus Professor of Ophthalmology in the Jefferson Medical College; Emeritus Surgeon to the Wills Eye Hospital. 1426 Walnut St.

1896. Thorington, James, A.M., M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic; Member of the American Ophthalmological Society; Ophthalmologist to the Vineland and Elwyn Training Schools for Feeble-minded Children. 120 S. Eighteenth St.

1898. Thornton, Edward Q., M.D., Assistant Professor of Materia Medica in the Jefferson Medical College. 922 Spruce St.

1896. Toulmin, Harry, M.D., Assistant Medical Director of the Penn Mutual Life Insurance Company. 925 Chestnut St.

1901. Tucker, Henry, M.D. 119 S. Twentieth St.

†1894. Tunis, Joseph Price, M.D., Assistant Physician to the Ear Dispensary of the Methodist Episcopal Hospital. 1426 Pine St.

1901. Turner, John B., M.D., Clinical Assistant in the Ophthalmological Out-patient Department of the Jefferson Medical College Hospital. 1525 Christian St.

1866. Tyson, James, A.M., M.D., Professor of Medicine in the University of Pennsylvania and Physician to the Hospital of the University of Pennsylvania; Physician to the Pennsylvania Hospital. 1506 Spruce St.

1897. Tyson, T. Mellor, M.D., Physician to the Philadelphia Hospital; Assistant Physician to the Hospital of the University of Pennsylvania; Physician to the Rush Hospital, to the Philadelphia Lying-in Charity Hospital, and to the Children's Aid Society of Philadelphia. 1506 Spruce St.

ELECTED

1904. Uhle, Alexander A., M.D., Assistant Instructor in Genito-urinary Diseases in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Genito-Urinary Diseases, University Hospital; Assistant Surgeon to the Dispensary of the German Hospital. 1327 Jefferson St.

1873. Van Harlingen, Arthur, Ph.B. (Yale), M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic; Dermatologist to the Children's Hospital. 1831 Chestnut St.

1903. Van Pelt, William Turner, M.D., Ophthalmic Surgeon to the Episcopal Hospital. 1528 Spruce St.

1893. Vansant, Eugene Larue, M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Visiting Physician to the Throat, Nose and Ear Department of the Howard Hospital. 1929 Chestnut St.

1897. Veasey, Clarence A., A.M., M.D., Assistant Professor of Ophthalmology in the Jefferson Medical College, and Assistant Ophthalmologist to the Jefferson Medical College Hospital; Ophthalmic Surgeon to the Methodist Episcopal Hospital, and to the Church Home for Children; Consulting Ophthalmologist to the Philadelphia Lying-in Charity. 1833 Chestnut St.

†1883. Vinton, Charles Harrod, M.D. Wernersville, Berks County, Pa.

1903. Wadsworth, William Scott, M.D. The Normandie, Thirty-sixth and Chestnut Sts.

1885. Walker, James B., M.D., Ph.D., Consulting Physician to the West Philadelphia Hospital for Women and Children. 1617 Green St.

1906. Walker, John K., M.D., Physician to the Dispensary of the Mary J. Drexel Home. 1632 Spruce St.

1904. Walsh Joseph, A.M., M.D., Physician to the Henry Phipps Institute; Visiting Physician to the White Haven Sanatorium; Physician to the Department of Tuberculosis at the Philadelphia Hospital. 732 Pine St.

1893. Warren, Joseph W., M.D., Associate Professor of Physiology in Bryn Mawr College. Bryn Mawr, Pa.

ELECTED

1895. Watson, Arthur W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Laryngologist to the Howard Hospital and to the Hospital for Diseases of the Lungs, Chestnut Hill. 126 S. Eighteenth St.

1886. Watson, Edward W., M.D., Physician to the Magdalene Home. 38 S. Nineteenth St.

1903. Weber, Charles H., M.D., Physician to the Episcopal Hospital; Physician to the Dispensary of the Children's Hospital. 1304 Pine St.

1906. Weisenburg, Theodore H., M.D., Instructor in Neurology and Neuropathology in the University of Pennsylvania; Associate in Neurology in the Philadelphia Polyclinic; Assistant Neurologist to the Philadelphia Hospital. 2030 Chestnut St.

1883. Welch, William M., M.D., Physician-in-Charge of the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary and to the Northern Home for Friendless Children. 1411 Jefferson St.

1897. Wells, William H., M.D., Adjunct Professor of Obstetrics and Diseases of Infancy in Philadelphia Polyclinic; Demonstrator of Clinical Obstetrics in the Jefferson Medical College. 1105 Spruce St.

1893. Westcott, Thompson S., M.D., Associate in Diseases of Children in the University of Pennsylvania; Visiting Physician to the Methodist Episcopal Hospital; Assistant Physician to the Children's Hospital; Pediatrist to the Jewish Hospital. 1833 Spruce St.

1884. Wharton, Henry R., M.D., Clinical Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Presbyterian and to the Children's Hospitals; Consulting Surgeon to the Bryn Mawr Hospital, to St. Christopher's Hospital for Children, and to the Pennsylvania Institution for the Deaf and Dumb. 1725 Spruce St.

1901. White, Courtland Y., M.D., Lecturer on and Demonstrator of Gross Morbid Anatomy in the Veterinary Department of the University of Pennsylvania; Pathologist to the State Live Stock Sanitary Board, to the Children's and to St. Joseph's Hospitals, and to the Henry Phipps Institute. 334 S. Sixteenth St.

ELECTED

1878. White, J. William, M.D., Ph.D., John Rhea Barton Professor of Surgery in the University of Pennsylvania; Surgeon to the University Hospital; Fellow of the American Surgical Association and of the American Association of Genito-urinary Surgeons. 1810 S. Rittenhouse Square.

1905. Whiteway, Harold M., M.D. 1924 Chestnut St.

1898. Whiting, Albert D., M.D., Surgeon to the Germantown Hospital; Assistant Surgeon to the German Hospital; Surgeon to the Southern Home for Destitute Children; Surgeon to the Out-patient Department of the German Hospital. 1523 Spruce St.

†1880. Willard, De Forest, A.M., M.D., Ph.D., Professor of Orthopedic Surgery in the University of Pennsylvania; Surgeon to the Presbyterian Hospital; Consulting Surgeon to the Germantown, to the Jewish, to the Atlantic City, and to the Phœnixville Hospitals. 1818 Chestnut St.

*1878. Williamson, Jesse, M.D., Wilmington, Delaware, one of the Surgeons to the Delaware Hospital. 1204 Delaware Ave., Wilmington, Del.

1902. Willson, Robert N., Jr., M.D., Instructor in Physical Diagnosis, and Students' Physician in the University of Pennsylvania. 1708 Locust St.

1881. Wilson, H. Augustus, M.D., Professor of Orthopedic Surgery in the Jefferson Medical College; Emeritus Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Consulting Orthopedic Surgeon to the Philadelphia Lying-in Charity Hospital and to the Kensington Hospital for Women; Senior Orthopedic Surgeon to the Philadelphia Hospital. 1611 Spruce St.

1874. Wilson, James C., A.M. (Princeton), M.D., Professor of the Practice of Medicine and of Clinical Medicine in the Jefferson Medical College, and Physician to the Hospital of the same (Faculty Staff); Physician-in-Chief to the German Hospital; Attending Physician to the Pennsylvania Hospital. 1509 Walnut St.

1902. Wilson, Samuel M., M.D. 1517 Arch St.

1897. Wilson, W. Reynolds, M.D., Visiting Physician to the Philadelphia Lying-in Charity Hospital. 1709 Spruce St.

ELECTED

1904. Wister, James W., M.D., Physician to the Out-patient Department of the Germantown Hospital. 5430 Main St., Germantown.

*1901. Witmer, A. Ferree, M.D. 78 West Eighty-second St., New York.

1893. Wood, Alfred C., M.D., Assistant Professor of Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Surgeon to the Philadelphia and to St. Timothy's Hospitals. 128 S. Seventeenth St.

1900. Wood, George B., M.D., Instructor in Laryngology in the University of Pennsylvania; Assistant in the Clinic for Diseases of the Nose and Throat at the Polyclinic Hospital. 129 S. Eighteenth St.

1865. Wood, Horatio C., M.D., LL.D. (Yale and Lafayette); Professor of Materia Medica and Therapeutics in the University of Pennsylvania; Associate Fellow in Medicine and Surgery of the American Academy of Arts and Sciences; Member of the National Academy of Science. 1925 Chestnut St.

1903. Wood, Horatio C., Jr., M.D., Demonstrator of Pharmacodynamics in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital. 3942 Walnut St.

1880. Woodbury, Frank, M.D. 218 S. Sixteenth St.

1866. Woods, D. F., M.D., Physician to the Presbyterian Hospital. 1501 Spruce St.

1901. Woods, Richard F., M.D., Assistant Surgeon to the Gynecean Hospital. 1501 Spruce St.

1888. Woodward, Charles E., M.D., Secretary of the West Chester Board of Health; U. S. Examining Surgeon; Member of the Medical Staff of the Chester County Hospital. West Chester, Pa.

†1897. Woodward, George, M.D. W. Willow Grove Ave., Chestnut Hill, Phila.

1903. Worden, Charles B., M.D., Associate in Diseases of the Stomach and Intestines in the Philadelphia Polyclinic; Physician to the Dispensary of the Presbyterian Hospital; Anesthetizer to the Orthopedic Department of the University Hospital; Physician to the Presbyterian Orphanage. 4208 Walnut St.

ELECTED

1860. Wurts, Charles Stewart, M.D. 1701 Walnut St.

1889. Young, James K., M.D., Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopedic Surgery in the Woman's Medical College of Pennsylvania; Associate in Orthopedic Surgery in the University of Pennsylvania and Assistant Orthopedic Surgeon to the University Hospital. 222 S. Sixteenth St.

1894. Zentmayer, William, M.D., Attending Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to St. Mary's Hospital; Ophthalmologist to the House of Refuge. 1819 Spruce St.

1899. Ziegler, S. Lewis, A.M., M.D., Sc.D., Attending Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to St. Joseph's Hospital; Membre Société Française d'Ophtalmologie. 1625 Walnut St.

1887. Ziegler, Walter M. L., A.M., M.D. 1418 N. Seventeenth St.

1895. Zimmerman, Mason W., M.D., Ophthalmic Surgeon to the Germantown Hospital. 1522 Locust St.

ASSOCIATE FELLOWS.

[Limited to Fifty, of whom Twenty may be Foreigners.]

American.

ELECTED

1876. Billings, John S., M.D., U. S. A., Astor Library Building, 40 Lafayette Place, New York City, New York.

1886. Bowditch, Henry P., M.D., 688 Bolston Street, Boston, Massachusetts.

1877. Chaille, Stanford E., M.D., University Building, New Orleans, Louisiana.

1886. Cheever, David W., M.D., 557 Boylston Street, Boston, Massachusetts.

1896. Conner, Phineas Sanborn, M.D., 215 West Ninth Street, Cincinnati, Ohio.

1893. Councilman, William T., M.D., Harvard Medical College, Boston, Massachusetts.

1876. Davis, N. S., M.D., 65 Randolph Street, Chicago, Illinois.

1892. Emmet, Thomas Addis, M.D., 91 Madison Avenue, New York City, New York.

1892. Fitz, Reginald H., M.D., 81 Arlington Street, Boston, Massachusetts.

1895. Fletcher, Robert, M.D., Army Medical Museum, Washington, D. C.

1903. Gorgas, William C., M.D., U. S. A., Washington, D. C.

1891. Jacobi, A., M.D., 19 East Forty-seventh Street, New York City, New York.

1906. Mayo, William J., M.D., Rochester, Minn.

1895. McBurney, Charles, M.D., 28 West Thirty-seventh Street, New York City, New York.

1906. Pilcher, Lewis Stephen, M.D., 386 Grand Avenue, Brooklyn, New York.

ELECTED

1886. Reeve, John C., M.D., LL.D., S. W. corner Third and Wilkinson Streets, Dayton, Ohio.

1886. Senn, Nicholas, M.D., 532 Dearborn Avenue, Chicago, Illinois.

1906. Shattuck, Frederick C., M.D., 135 Marlborough Street, Boston, Massachusetts.

1896. Sternberg, George M., M.D., U. S. A., 1019 Sixteenth Street, N. W., Washington, D. C.

1896. Tiffany, L. McLane, M.D., 831 Park Avenue, Baltimore, Maryland.

1894. Warren, J. Collins, M.D., 58 Beacon St., Boston, Massachusetts.

1894. Weir, Robert F., M.D., 11 East Fifty-fourth Street, New York City, New York.

1892. Welch, William H., M.D., Johns Hopkins Hospital, Baltimore, Maryland.

Foreign.

1890. Baccelli, Guido, Rome, Italy.

1877. Barnes, Robert, M.D., 15 Hartley Street, London, W., England.

1894. Brunton, Sir T. Lauder, M.D., 10 Stratford Place, London, W., England.

1883. Fayrer, Sir Joseph, M.D., LL.D., F.R.S., Belfield, Falmouth, England.

1903. Finlay, Charles J., M.D., Havana, Cuba.

1899. Fraser, Thomas R., M.D., LL.D., F.R.C.P., F.R.S., 13 Drumsheigh-Gardens, Edinburgh, Scotland.

1903. Horsley, Sir Victor Alexander Haden, F.R.S., 25 Cavendish Square, London, England.

1906. Hutchinson, Jonathan, M.D., LL.D., F.R.S., 15 Cavendish Square, London, W., England.

1896. Jaccoud, Prof. S., Rue Tronchet 35, Paris, France.

1874. Jackson, J. Hughlings, M.D., 3 Manchester Square, London, England.

1893. von Jaksch, Rudolf, M.D., Prague, Bohemia.

1903. Kocher, Prof. Theodor, M.D., Berne, Switzerland.

ELECTED

1896. Leyden, Ernst, M.D., Berlin, Germany.
1877. Lord Lister, M.D., LL.D., F R.S., 12 Park Crescent, Portland Place, London, W., England.
1906. Myles, Sir Thomas, M.D., 33 Merion Square, W., Dublin, Ireland.
1896. Pye-Smith, P. H., M.D., 48 Brook St., London, W., England.
1898. Roddick, Thomas G., M.D., 80 Union Avenue, Montreal, Canada.
1869. Valcourt, Th. de, M.D., Cannes, France.
1904. Waldeyer, Prof. Wilhelm, M.D., Berlin, Germany.

CORRESPONDING MEMBERS.

1880. Carrow, Flemming, M.D., Washington Arcade, Detroit, Michigan.
1880. Chiara, Domenico, M.D., Florence, Italy.
1886. Dey, Kanny Lall, M.D., Calcutta, India.
1885. Rendu, Jean, M.D., Lyons, France.

NECROLOGICAL LIST.

FELLOWS.

WILLIAM S. FORBES,	December 18, 1905.
WILLIAM G. PORTER,	January 30, 1906.
WILLIAM M. ANGNEY,	November 19, 1906.

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MEMOIR OF DAVID DENISON STEWART, M.D.

AN APPRECIATION.[1]

By SOLOMON SOLIS COHEN.

Of few physicians, even of those most eminent in their day and generation, can it be asserted that they have left an enduring record in the history of medicine, and I shall not venture to say that the work of that Fellow of the College of whom I am to speak briefly to-night, will never be forgotten. It may reasonably be said, however, that at least one of his contributions to medical art will outlast many books that in their day have occupied a foremost place in medical literature. I refer to his improvement in the technique of electrolytic wiring in the operative treatment of aneurysm. In the *American Journal of the Medical Sciences* for October, 1892, he published his first paper on the "Treatment of Sacculated Aortic Aneurysm by Electrolysis through Introduced Wire," and he returned to the subject in the *American Journal of the Medical Sciences*, August 1, 1896, and again in the *British Medical Journal*, August 14, 1897, and in the *Philadelphia Medical Journal*, August 12, 1898. From the last named paper I extract Stewart's own modest statement of his personal contribution to the subject: "Having been disappointed for a long time with the results obtained by the usual methods of treatment in such cases of aneurysm as were insusceptible of cure by surgical means, and finding too often inefficient the employment of potassium iodide, with the Tufnell plan of rest and diet, however carefully adapted to suit a particular case, I was constrained some years ago to experiment with a method originally proposed and made use of by Corradi, that

[1] Read June 6, 1906.

of the electrolytic action of a galvanic current, through wire introduced into the aneurysmal sac. The method as devised by Corradi and employed in Burresi's case, and as subsequently employed in the greater number of the seven cases then on record, was faulty in many vital particulars. In several cases, as in Corradi's, the wire was not previously drawn so as to form coils or snarls in the sac; the wire was in some instances of improper caliber and of improper material; in several it was in amount introduced enormously in excess of what could be productive of ultimate good. In one of these cases a large amount of catgut (100 feet) had been first introduced prior to the passage into the sac of 150 feet of wire. In one no mention of the polarity of the current passed through the wire is made. It was as likely to have been the kathode as the anode.

"The fact that Corradi first carried out this procedure was generally unknown until attention was called to it in my first paper. The method had been very erroneously styled by one writer 'the Loreta-Barwell operation.' Loreta had previously simply introduced wire into an abdominal aneurysm first exposed by celiotomy, without galvanism. It must be said here that, should it be desired to dignify the method by the name of its originators, it could only rightly be termed the Moore-Corradi. Moore first in 1864 introduced filiform material (in his case, wire) into an aneurysm, and Corradi first combined this method with electrolysis. . . .

"In Moore's case, a great excess of wire had been introduced and death occurred from sepsis. In many of the other cases so excessive an amount of wire was employed as to interfere with the ultimate result desired, obliteration of the sac-cavity. . . .

"Briefly, the newer method, as practised by myself, consists in introducing into the sac, under the strictest antiseptic precautions, a fine coiled wire, previously so drawn that it may be readily passed through a thoroughly insulated needle of somewhat larger caliber than the wire, and, after introduction, assume the snarled spiral coils; with a moderate amount of wire, the entire caliber of the sac will be occupied, unless the cavity be already filled with coagula or the sac be of unusual size. . . .

"The wire must not be too great either in amount or caliber, nor too bulky, nor too highly drawn, in order that the results desired be not interfered with; nor should the wire be of a material as brittle as steel, nor of hard drawn iron, as was recommended on theoretic grounds by Stevenson; for with the last, as I have shown by experiment, so great a quantity of detritus will result from the decomposition of the iron and the formation of insoluble salts under the influence of the current, even with low amperage, that there is danger of embolism.

"Silver, gold, or platinum wire is undoubtedly the preferable material."

Stewart's results were so brilliant and his publications so evidently authentic, that he may be said to have fairly established the improved method as a recognized therapeutic procedure; and it should properly be referred to in all subsequent medical writings as "Stewart's Method." This was fully recognized by the Edinburgh Society of Physicians when, in 1904, he was made corresponding member of that society.

David Denison Stewart, son of Franklin and Amelia Jaques Stewart, was born in Philadelphia, October 10, 1858, and died June 13, 1905, after an operation for appendicitis. His general education was obtained from tutors and private schools and his medical education at Jefferson Medical College, from which he received the degree of Doctor of Medicine in 1879. In 1885 he became assistant in the medical clinic of Professor J. M. DaCosta, at Jefferson Hospital, of which I was at that time chief, and where in consequence of intimate daily association and mutual help, a friendship began that, as the Arabs say, "endured until the coming of the divider of friends and the separator of hearts," and that is still a precious memory. In 1887 he succeeded me as chief of the clinic. At about the same time he was appointed lecturer on diseases of the nervous system in the Summer School at Jefferson Medical College, and about 1890 he became clinical lecturer on medicine during the regular term. This position he resigned in 1895 to become professor of clinical medicine in the Philadelphia Polyclinic, which position he held until 1901; his clinic being

devoted especially to diseases of the stomach and intestines, a field of practice to which he had for many years devoted the larger part of his attention, and which he enriched with many original observations. He had served as physician to St. Christopher's Hospital for Children and to St. Mary's Hospital, and at the time of his death he was visiting physician to the Episcopal Hospital. He came prominently into professional attention early in his career by his skill in diagnosticating certain cases of lead encephalopathy that occurred in the Kensington district of Philadelphia, in consequence of the use by bakers of chrome yellow in the coloring of cakes, which were largely sold to children. It had been supposed that there was a local epidemic of cerebrospinal meningitis. Stewart, who was living at that time in the affected neighborhood, was called to some of the cases and in a few days had traced the outbreak to its source. I remember the intense interest with which Stewart related his discoveries to his colleagues in the medical clinic at Jefferson. His absorption in the matter was characteristic. He thought of it constantly, slept with it, waked with it and spent most of his days and nights working upon it, in order to fit himself to investigate its literature more thoroughly, as well as to carry out more systematically his studies of the cases that came under his observation. He renewed his practical work in chemistry, entering the laboratory of Dr. Henry Leffmann and there laying the foundation of that aptitude in chemical research which determined the future course of his professional study and practice in diseases of the stomach and of the kidneys. In this work, as in his work upon aneurysms and in his work upon lead poisoning, patience and thoroughness were the chief characteristics. I have sat with him in his laboratory, while he was studying urine and stomach contents, until late at night, and have left him still at work upon an investigation so minute that its clinical value was not apparent to me, but which he pursued for the sake of accumulating data that might thereafter be valuable in diagnosis and therapeutics. He had both the clinical and research instincts highly developed. He sometimes arrived at a diagnosis in an obscure case very quickly, notwithstanding which,

he would proceed with the most painstaking and time-consuming physical and chemical examinations in order to test the accuracy of his conclusions, and revise them if necessary. His preëminence in his special field was fully recognized by professional workers, as shown by his comparatively early election to the Association of American Physicians and his selection as the first President of the American Gastro-Enterological Association after his reluctance to the formation of that special society had yielded to its inevitableness.

His most lengthy contributions to medical literature are the articles on "Diseases of the Stomach" in Hare's *System of Practical Therapeutics;* "Diseases of the Spinal Cord" in Loomis' *System of Practical Medicine;* "Diseases of the Kidneys and Lithuria" in Keating's *Cyclopedia of Diseases of Children;* "Diseases of the Stomach" in Sajous' *Cyclopedia;* and a little handbook on *Electro-Therapeutics.* In addition to these systematic writings, he has left papers and addresses which practically cover the whole field of clinical medicine. He never wrote, however, unless to contribute a new idea or a practical observation. His style, though lucid, is somewhat involved; a circumstance which, like the lengthiness of some of his papers, is to be attributed to his desire to be both thorough and accurate, thus leading to qualification upon qualification, and allusion upon allusion, in historical reference or therapeutic recommendation. Among his most important papers may be cited, "Some Phases of Gallstone Disease, with Special Reference to Diagnosis and Treatment," *American Journal of the Medical Sciences,* May 1903; "A Serious Fallacy Attending the Employment of Certain Delicate Tests for the Detection of Serum-albumin in the Urine, Especially the Trichloracetic Test," *Medical News,* May 5, 1894; "The Reactions of Nucleo-albumin (erroneously styled Mucin) with the commonly employed Urinary Albumin Tests; the Difficulty of Distinguishing these Reactions from those of Serum-albumin, Globulin, etc.," *Medical News,* July 14, 1894; "On the Occurrence of Primary Tuberculosis of the Kidney, with Special Reference to a Primary Miliary Form," *Medical News,* August 14, 1897.

To three other papers, dealing with one subject, attention may in conclusion be specially directed, as they embody an original observation of great practical value. They are: "On the Occurrence of a Form of Chronic Bright's Disease Other than Typical Fibroid Kidney, without Albuminuria, *American Journal of the Medical Sciences*, December 1893, read before the Pan-American Medical Congress, Washington, 1893; "Further Remarks on the Occurrence of a Form of Non-albuminous Nephritis Other than Typical Fibroid Kidney," *Medical News*, April 14, 1894; read before this college, April 4, 1894. "A Further Communication on the Occurrence of a Hitherto Undescribed Form of Chronic Nephritis Unassociated with Albuminuria," *London Lancet*, Sept. 4, 1897; read before the Association of American Physicians, May 1897. In these three papers Stewart called attention to a condition which, while not common, cannot be so rare as its absence from medical literature, previous to his communication, would indicate. It is not my intention to discuss the condition here and now, but merely to emphasize the importance of Stewart's work in describing it and establishing its place in nosology.

Dr. Stewart was unmarried. His intimates were few. His disposition was sensitive and his reserve sometimes took the form of impatience—this being due perhaps to prolonged ill health and to hard work under trying conditions. In the latter eighties he had become infected with tuberculosis, probably, as I thought at the time, through excess of zeal in the treatment of a patient in whom he was especially interested. Both lungs and larynx were involved and his complete recovery under medicinal, climatic and general hygienic treatment was one of the evidences upon which, before such prognosis had become common, I felt justified in announcing a favorable view of the outcome in tuberculosis in general when patients could be carefully treated under good conditions. In his personal and professional relations, Dr. Stewart was guided by a high standard of ethical perceptions—in fact belonged to a school of thought and manner often called old-fashioned or even old-fogyish. He had a supreme contempt for

chicanery and for *ad captandum* methods of all kinds; and could indulge in quite picturesque criticism of men and actions that had excited his scorn or his resentment. His reading in medicine and in general literature was wide, and he had a passionate love for good music. He was much beloved by his patients, many of whom became his fast friends, feeling justly that to his skill and patient investigation they owed life and comfort. He became a Fellow of the College in 1888, and his work as man and as physician during his years of fellowship redounded to its honor and to the advancement of its high objects.

MEMOIR OF GEORGE READ MOREHOUSE, M.D.[1]

By S. WEIR MITCHELL, M.D.

I REGRET that the following memoir lacks something because of there being no one alive who could competently aid me with information.

George Read Morehouse was born at Mount Holly, New Jersey, on March 25, 1829. The family history is interesting. Sometime before the war for independence, Andrew Morehouse emigrated from the North of England to the Colony of New York. He served later as a Colonel during the Revolution. His son Abraham, apparently a man of means, seems to have been led into the wild land speculation, which during Washington's terms of office ruined so many. He bought vast tracts of coal lands in Virginia and Pennsylvania; and in Louisiana acquired an entire parish, the territorial equivalent of our county. It still bears his name. After his death these possessions were lost owing to nonpayment of taxes. His only child, Doctor Morehouse's father, was finally left in comparative poverty. He became in time the rector of the Protestant Episcopal Church of St. Andrew's, Mt. Holly, New Jersey, and retained this charge for forty-six years. Doctor Morehouse's mother was Martha Read, a granddaughter of Joseph Read, sometime attorney for the crown of the Province of New Jersey. Our Fellow entered *cum laude* as a Junior at Princeton College and was graduated in July, 1848, with high honors. In September of that year he matriculated at the University of Pennsylvania. He left it at the close of one term for the Jefferson Medical College and there was graduated March, 1850, and in the following year became M.A. of Princeton.

[1] Read November 7, 1906.

In 1875, desiring to compete for the chair of Physiology in the University of Pennsylvania, he obtained from that institution the degree of M.D., but later withdrew from the canvas, fearing that want of laboratory training would unfit him for the position.

In 1892 he received from Princeton the degree of Ph.D. *Hon. Causa.* From his first settlement here in practice he had an unusually large and growing success as a general practitioner; and later as a valued consultant. It was well deserved. I have known few men who by reason of natural endowments were as well fitted to succeed in our difficult profession. Except in mercantile life it is unusual to find a man capable of original thought and research who has no enjoyment in pursuits outside of his business; but such being the case with Dr. Morehouse, he gave all there was of a very able intellect to the practical work of life. He cared little for travel or art, was merely a general reader, and found no joy in sport, exercise, or the life of the woods. Thus limited in the range of his tastes he found his largest source of happiness in the exercise of his powers as a physician, and to this work he gave himself with undistracted attention. If he thus won a great success, it had also its narrowing influence, and this he discovered when too late and regretted that the mind so competent for work had lost the will and wish to play.

In practice he was industrious, attentive, full of resources and capable of novel views. A sanguine temperament, and remarkable power of explaining cases to the satisfaction of the patient made him always acceptable; while his gracious manner and certain kindliness added to the sense of confidence his presence inspired, the charm of genial social companionship.

Although he was a keen observer, quick to see and devise new means of helpfulness, for some reason which I do not understand, he wrote very little. The act of putting his thoughts on paper was for him difficult, or with this he may have lacked ambition or power of concentration. Whatever the cause, this seemingly fertile mind left us far less than it should have done. While he was in social life a very gay and agreeable comrade, he had that form of shyness which made him avoid public speaking, and thus

he was rarely heard in our debates or felt in the general life of the profession. He was, as I have said, without any of the tastes for exterior pursuits or sports, which do so much to freshen a man, and invigorate and recreate the energy our laborious life demands for its permanent utility.

His medical papers, few and practical, were principally a case of laryngotracheotomy and a case of use of atropia in prolapse of the iris.

A paper on ether tests for true epilepsy I have been unable to find.

All of Dr. Morehouse's more important work was done in conjunction with other physicians, and divides itself into two classes: Laboratory and Hospital researches. We had long been on terms of close friendship, when in 1860, having discovered certain facts of novel interest in reptilian physiology, I offered him the chance of working out with me the problems presented. It seemed to me a pity that a mind so well equipped for original research should not be thus used. He hesitated long, but when at last he committed himself to the work, I soon realized how right I had been. Together we completed my former researches. I may say in justice to my friend that this research on the anatomy and physiology of the respiratory organs of chelonia is now in some sense a classical essay. It corrected the erroneous views on the physiology of those reptiles, and set forth the discovery of the only nerve chiasm outside of the cranium. The work was most laborious and occupied during one long summer, the late afternoon and night hours of two busy physicians. I myself wrote the physiology and to Dr. Morehouse was assigned the respiratory anatomy of chelonia. At this time was first felt the difficulty which was in future to embarrass his co-workers. My own part of this long paper was rapidly completed. His part was in some ways more difficult, and the subject less familiar as he had not been a student of comparative anatomy. Whether because of this, or that he found some singular obstacle in writing, he was eighteen months at work on his share of the essay. When completed it was a piece of original descriptive anatomy which was so admirable

as to be praised very warmly by Leidy, and by Jeffries Wyman as a faultless specimen of comparative anatomical statement. After reading it Prof. Agassiz asked me who was this remarkable young naturalist, and why had he never heard of him. Despite these opinions he declined further co-operation in research, a thing I could never understand.

Early in the Civil War Dr. Morehouse served in the Filbert Street Hospital as assistant surgeon under contract. When the Hospital for Nervous Diseases was organized I asked to have him as my colleague. Then Dr. William W. Keen joined us and we remained in useful co-partnership of labor up to 1865. The story of those years has been elsewhere told by Prof. Keen and myself. We were relieved of much routine red-tape business by a liberal order of the Surgeon-General. Our remaining task consisted in treatment and in personal taking of notes covering thousands of pages. It is pleasant to be able to do justice to the skill and persistent energy Dr. Morehouse threw into this labor. Our joint product of these years of industrious research resulted in certain books and papers, and over these and their conclusions we consulted often and at great length. To each of us was assigned his separate task of writing; but as what we thus printed was the outcome of the thoughts and labor of all three, all our names appeared as joint authors. Dr. Keen and I each wrote personally our several papers as we had agreed to do. To these Dr. Morehouse contributed his full share in the way of note-taking and discussions. All of these papers are well known, and have passed into the medical history of war, examples I am proud to say of well-used opportunities.

To Dr. Morehouse was confided a great mass of notes on three subjects: *Acute and chronic exhaustion* was to be a full study of what is now called neurasthenia. This paper was planned and discussed with care. He had also to write of *choreal spasms* from wounds and of *epilepsy*. He accepted these tasks with seeming confidence, having especially asked to be given the subject *epilepsy;* but then my friend once more betrayed his difficulty in putting his ideas on paper. Many of our notes on these subjects

were non-official records and personal; but though all were for years in my friend's possession, nothing was done, and finally an accidental fire in his office entirely destroyed what would have anticipated much of value which has since been rediscovered by others. My own distress at the loss of our records of important medical discoveries led me recently to examine the duplicated notes of our hospital records, which I confidently expected to find in the War Office. To my surprise they were very defective and a large part of what we turned in must have been lost.

I have never yet been able to determine wherein lay a man's difficulty in putting on paper what seemed to be clear and definite and of which he could talk so lucidly. What this remarkably able man was competent to do, and did do, I have here recorded. What he did not go on to do is still to me a matter of wonder, interest, and friendly regret.

During our long service he operated often and had the skilful hand, the ready decision of the moment, and the courage which might have made him a surgeon of distinction. I recall two instances of his capacity. In one desperate case of paralysis he removed through the mouth a bullet which had lodged in the cervical vertebra. The patient recovered. I saw him trephine the skull and open a cerebral abscess, the first case I believe on record unless one by Detmold preceded it.

Dr. Morehouse married Mary Ogden, relict of David C. Ogden, of Woodbury, New Jersey. He left no children. Dr. Morehouse became a Fellow in 1863. He was long on the consultant staff of the Orthopedic Hospital; at one time on the staff of St. Joseph's Hospital; a member of the Philosophical Society and the American Academy of Medicine, and of the Union League. He died of renal disease on November 12, 1905.

ANNUAL ADDRESS OF THE PRESIDENT.[1]

By ARTHUR V. MEIGS M.D.

It struck me, as I listened to the annual reports which were presented at the December meeting, that two of the most important of them were those of the Treasurer and Secretary. The last volume of the TRANSACTIONS contains the annual address of the President, summaries of the reports of two of the standing committees, and lists of the scientific papers read at the meetings of the Sections, but not the reports of the Treasurer or Secretary. The Treasurer's report shows the financial status of the institution, and from it alone is it possible to learn what it will be safe for the College to undertake from the pecuniary point of view? The Secretary's report is a clear and concise document which gives from period to period the history of the accomplishment of the College during the year. Your President naturally tries not to repeat in the address, which according to the law he must deliver each year, what has already been told you in the annual reports. The reports of the Treasurer and Secretary are placed on file, which means that an important, perhaps the most important, part of the record of the year's work is consigned to oblivion. This defect, I think, should be corrected, for I believe that the preservation of our records in accessible form is a material part of our work. It has always been my opinion that our volumes of TRANSACTIONS should be as complete as it is possible to make them, and I think that it is too much the habit to underestimate the value of our publications. The Committee on Publication, I believe, should be directed by resolution to include

[1] Delivered at the meeting held January 3, 1906.

in subsequent volumes of the TRANSACTIONS the reports of the Treasurer and of the Secretary, in order that when anyone studies the history of the College in the future it may be possible to find fuller information than can be obtained from the older volumes. The additional expense entailed by having the two reports printed would be trifling.

The College has grown very much larger in all of its departments in the last few years, and in order to meet the increase of its expenses entailed by this natural growth it is very desirable that the pecuniary resources should be increased. It has come to my knowledge recently that some of the medical societies of this country demand the payment of an annual contribution from non-resident members. The practice of the College has for a long time been to relieve them of the payment of dues. The wisdom of continuing this custom is, in my judgment, questionable. Our non-resident Fellows regularly receive the TRANSACTIONS of the College and all of the notices of meetings are sent to them, besides which they have the same rights in the government of the corporation as the resident Fellows. As the non-residents have the right to vote, and as it costs the College quite a sum of money each year to pay the expenses entailed by their continuance as members of the corporation, and as other societies oblige them to pay annual dues, it seems to me to be no more than just that our non-resident Fellows should contribute something toward the support of the College. If it should ever be determined to demand an annual contribution of them it should only be done after a careful consideration of the probable effects of such action and with due consideration of their wishes and feelings. It might, perhaps, be best to make a law that all those who hereafter become non-residents shall pay dues, but to allow those who are already upon the non-resident list to continue their membership without paying annual dues. I recommend that a resolution be passed referring this question to the Council for consideration and report.

During the two years that I have had the honor to serve as your President I have several times been puzzled to know what

was my duty in regard to the status of special committees. The By-laws provide that all special committees "shall report at the stated meeting immediately succeeding their appointment, unless it be otherwise determined by a resolution or a law of the College." This provision is frequently disregarded, and your presiding officer is forced either to defeat the purpose of the College by declaring the offending committee to be out of existence before it has completed the work it was appointed to perform, or to pass by without notice the infraction of the law. The consequence is a good deal of confusion, and it is often impossible to reach a decision which will surely be correct whether a particular special committee is still in existence or if it has ceased to exist.

I have examined the old editions of the By-laws of the College back to the first one, which was printed in 1790, and I cannot resist the inclination to digress from my subject long enough to tell you that they are most interesting, for they show something of what used to be the customs and purposes of this society and how it has been gradually changed to meet the changes of the times and of men. But to return to the subject of the special committees, I found that not many years ago the provision in the law which I have quoted which makes it the duty of special committees to "report at the stated meeting immediately succeeding their appointment" was followed by this,—"and failing to make a final report at the proper time, unless a satisfactory reason therefore be given, they shall be discharged and the matter dropped or referred to another committee, as the College may determine." This provision appears for the first time in the edition of the By-laws printed in 1834, and for the last in that of the year 1875, having stood unchanged for forty-one years. In the edition of 1882 for the first time the law appears in its present form, the provision for the discharge of special committees being omitted. Under the old arrangement the law acted automatically and special committees expired by limitation. Under the present law it requires action by the College to make it sure that a special committee has gone out of existence. I am very doubt-

ful whether the change was for the better. The term of existence of our standing committees is one year, for which period they are elected every January. All of the officers except the elected Councillors, whose terms run for three years, are elected to serve a year only. I believe it would be well if a provision were added to the By-laws that the special committees appointed during each year should cease to exist at the end of December unless otherwise ordered by the College. It may be thought that the President should be able satisfactorily to arrange the business of the College regarding special committees under the law as it now stands by calling upon them to make their reports, but after having tried for two years the administration of our present law I have found it very difficult to administer, not to say impossible.

I believe, therefore, that it might be productive of good, and could not do any harm, if the question of the advisability of some slight modification of Chapter XV, which deals with special committees, were referred to the Council for consideration and report.

Nine members of the College have died during the past year; three Fellows and three Associate Fellows.

Dr. David D. Stewart was elected a Fellow in 1888. He was for a time one of the attending physicians to the Episcopal Hospital, and he made a special study of diseases of the stomach and attained considerable reputation by his skill in the diagnosis and treatment of diseases of that organ. The Censors have directed that a memoir of his life be prepared and in due time it will be laid before you. Dr. Stewart died June 13, 1905.

Dr. Robert P. Robbins was elected a Fellow in 1888. He was a man of scientific and scholarly inclinations and he spent a good part of his life in the work of teaching. He served for some years with the medical corps of the United States army, and was during a part of this time in the Philippine Islands. Dr. Robbins died August 13, 1905.

Dr. George R. Morehouse was elected in 1863, and had therefore been a Fellow for forty-two years. He had for many years a very large practice among the best people of the city and in

his younger days, during the war of the Rebellion, he served with credit in the United States army. The Censors have directed that a memoir of him be prepared and in due time it will be laid before you and printed in the TRANSACTIONS. Dr. Morehouse died November 12, 1905.

Dr. J. von Mikulicz-Radecki was elected an Associate Fellow in 1903. He was a surgeon and teacher connected with the University of Breslau in German Poland, and his name was placed among the number of our foreign associates because he had attained great fame and distinction. Professor von Mikulicz-Radecki died June 17, 1905.

Dr. John W. Ogle was elected an Associate Fellow in 1873. He was a physician who attained great distinction in London, and was connected with the St. George's Hospital and Medical School. Dr. Ogle died August 8, 1905.

Mr. Christopher Heath was elected an Associate Fellow in 1883. He was surgeon to the Westminster Hospital of London and was also an anatomist of considerable note. Among the books he wrote was *Practical Anatomy, a Manual of Dissection,* a work which passed through nine editions. Mr. Heath died August 8, 1905.

The College has lost by death during the year just past a less number of its members than it lost in 1904, and it can again be said, as I said a year ago, that those members who have gone from us were all men to whose remembrance we may turn back with pride. It has been the effort of our institution from its beginning to admit to Fellowship only physicians above the average in intelligence or capacity, and certainly the death-roll of the last two years would indicate that the effort has been crowned with success.

During the past year the question of altering or rebuilding our hall or of removing to another location has been several times before the College. I expressed my conviction a year ago, in the annual address, that the right solution of this important question would finally be reached, and I am still of the same opinion. Although I have confidence in the wisdom and uprightness of

our members, and am optimistic regarding the future, I cannot help seeing that the College is surrounded by dangers. Perhaps the greatest of these is of strife among our members because of differences of opinion regarding what should be done. This danger I firmly believe will be avoided; but there is another one which I think is imminently threatening, and that is financial embarrassment. The College has bought an unimproved lot of ground for $80,000, which has been ordered to be sold. It is evident that a sale will not easily be effected, for although a year has passed by not one possible purchaser has appeared. This proves that it will be difficult to effect a sale at any price, be it less or more than was paid. Last June, the necessary preliminary arrangements having been made at the stated meetings of the College, an agreement was entered into with the city of Philadelphia by which the College has bound itself to purchase for $50,000 the schoolhouse and lot at Seventeenth and Pine Streets if it should be vacated within a certain period. We have now about $30,000 as a building fund, and about $20,000, which is the permanent fund. The principal of this latter sum cannot be expended for any purpose without a change of the By-laws, and this can be effected only by the vote of a majority of two-thirds after due notice given at a previous meeting. If it is possible to form a judgment of the views of the Fellows from the results of the voting at the meetings during the last year, when the question of site was considered, it is doubtful if a two-thirds majority will favor wiping out the permanent fund to buy the lot at Seventeenth and Pine Streets, for it was plainly evident last winter that many of the Fellows disapproved both of that site and of the arrangement into which it was necessary to enter with the city to make the purchase possible. Should the various difficulties be removed and the lot be purchased, the College would at once be obliged to meet the payment of taxes, besides many other heavy expenses which are invariably attendant upon the ownership of a large unproductive property in a city.

With the present annual income, taxed as it is to the utmost to maintain the various departments, the College would find itself

in a situation of serious financial embarrassment if it should buy the lot at Seventeenth and Pine Streets. This financial embarrassment cannot be escaped unless an amount of money is obtained sufficiently large not only to meet the cost of a new building and of removal to it, and of the living expenses during the interval that would elapse before removal could be effected, but sufficiently large to include also an endowment fund to yield income enough to meet the increased cost of maintenance in a a new and larger hall. It has always seemed to me, and it is an aspect of the subject that fills me with uneasiness, that the majority of the Fellows appear to think that the principal part of the difficulty of rebuilding would be overcome if the cost of a new hall were once paid, forgetting that the whole object of a new hall is for the purpose of enlarging the College and especially the library. This would necessarily involve a great increase of our annual outlay, for the library is already much the most costly part of the College. In the various plans and discussions of the subject very little has usually been said of this, which is the most serious difficulty that will have to be met, and it can only be met in one of two ways, either by doubling, or perhaps even by trebling, the amount of the annual dues paid by the Fellows or by obtaining a large endowment fund. We all know how difficult it is to collect money, especially for purposes of endowment, which object does not generally appeal to those disposed to be donors.

At present the College is financially sound, but a misstep might at any time bring upon it great difficulties or even disaster. Unfortunate, therefore, as is the existing situation of uncertainty regarding what shall be done, and of discomfort in the library, I should much prefer to see the College continue to endure this than to see any large improvement undertaken unless it is first demonstrated that it is safe, that a majority is in favor of it, and will continue in favor of it, and will work unitedly for its consummation.

In conclusion, permit me to congratulate you that the College has passed through another year in such a manner that it still continues to deserve the distinction it has for so long a period enjoyed.

DESCRIPTION OF THE WORK OF THE CRAIG COLONY FOR EPILEPTICS.[1]

By W. P. SPRATLING, M.D.,
SONYEA, N. Y.

What I have to say is largely by way of an introduction to the pictures of epileptic seizures to be shown by Dr. Chase. The Craig Colony is a State institution for the care of epileptics and was founded in 1894 by an act of legislature. It covers 2000 acres of land, and there are at present 1050 patients, with 900 on the waiting list. Buildings are now being erected for 200 more.

Epilepsy is one of the oldest diseases in human history It was described by Hippocrates. Little or no progress was made in the study of the disease until comparatively recently. In 1867 Germany took up the question of providing for epileptics in a practical way. In 1890 Ohio established the first institution in this country. In 1894 the New York State Colony at Sonyea was established, and since that time there have been five other State Hospitals. The Colony at Sonyea remains the only extensive Colony to this time, though sooner or later others will be sure to be created.

Epilepsy is one of the strangest diseases in human history and one of the most difficult to study. I am going to offer you a definition of epilepsy, in spite of the fact that it is difficult to give a definition broad enough to cover all cases and yet sufficiently restrictive to be of scientific value.

"Epilepsy is a disease or disorder affecting the brain, characterized by recurrent paroxysms, which are abrupt in appearance,

[1] Read by invitation, January 3, 1906.

variable in *duration* but generally short, and in which there is impairment or loss of consciousness, together with impairment of motor co-ordination, with or without convulsions." The old idea that there must be convulsive movements during an epileptic attack is a mistake. There are forms of epilepsy in which an unskilled observer may carefully scrutinize the face of the patient during the progress of a seizure and see no evidence of a seizure. There are other types in which motor co-ordination is greatly disturbed while the mind remains practically unimpaired. This is notably so in certain forms of Jacksonian epilepsy. We have not yet reached the point in our study of this disease that we can classify it on a etiological basis. At present it is classified according to symptomatology.

There are four chief forms of epilepsy and many subdivisions. The day has gone by when we can speak simply of epilepsy. We must speak of the epilepsies, because the types and variations are so numerous. The four chief forms are "grand mal," "petit mal," "psychic," and "Jacksonian." Psychic epilepsy pure and simple is exceedingly rare. Not more than 1 per cent. have this form to the exclusion of the other types, although many persons who have grand mal epilepsy have the psychic attacks also. Jacksonian epilepsy in the pure form is a little more common than psychic. About 2 per cent. of the Craig Colony patients have the latter form.

Epilepsy has no respect for age. It may be in the individual at the time of birth, or it may not occur until extreme old age. One man under my care had his first attack at the age of eighty-nine. It was of the grand mal type and was due to arteriosclerosis. 83 per cent. of the 2000 cases admitted to the Craig Colony to this time had the disease *before* the twentieth year. It is essentially a disease of early life. Up to the twentieth year there is no difference in ratio in which two sexes suffer. But after the twentieth year it is more common in men in the ratio of eighty women to a hundred men. If a man escapes syphilis, alcoholism, and injury to the brain, he is not likely to have epilepsy. Heredity plays an important part. 16 per cent. of the 2000 cases studied

at Sonyea were due to the fact that the mother or the father had the same disease; 15 per cent. because either one or the other parent was insane. Fully 66 per cent. of all patients admitted to the Craig Colony had epilepsy because their father or mother suffered from some neurotic disorder.

The practical way to get at the etiology is to begin with the birth accidents. We have something like 112 or 115 young persons at Sonyea who are paralyzed in one arm or leg, or who have a a complete hemiplegia or diplegia. I think the surgery of the future is going to do brilliant work in preventing infantile palsies, which in time might prevent about 8 per cent. of all the epilepsies.

Passing the accidents of birth, I do not believe that dentition causes *true* epilepsy. I do claim, however, that difficult dentition in a child whose heredity is bad, and who was born with *a tendency to nervous disease*, may be an exciting cause of convulsions, which convulsions, if allowed to go unchecked, may develop into true epilepsy. The specific fevers—especially scarlet fever—cause many cases of epilepsy. Many patients do not have convulsions during the fever, but six to nine weeks later, co-incident with scarlatinal nephritis.

More epilepsies occur between the 12th and 15th years than at any other period. This is especially true in women. At the Craig Colony we have performed much abdominal surgery in cases in which the seizures grouped themselves about the menstrual period, and we have had some excellent results. We look for a neurotic ancestry in such cases.

The next period is when a woman is married and in the puerperal stage.

The three causes in men are syphilis, alcoholism, and trauma to the brain. After that comes the old age period, at anywhere from forty to ninety years. Epilepsies of that period are often amenable to treatment in a way quite unexpected and often very gratifying. I have obtained excellent results in the treatment of such cases.

An exact prognosis in epilepsy is difficult to get at. Nobody knows what percentage can be cured. There is no universal

agreement as to how long an individual should remain free from attacks before being considered cured. At Sonyea we do not consider a patient cured until two years have elapsed without seizures. They are then discharged and kept under observation by correspondence for two or three years longer. I have seen patients who, I am satisfied, were cured after a year's treatment; others I could not say were cured, though their attacks were checked, unless they lived under certain restrictions for years after. One great principle in treatment is that *freedom from epilepsy is often a matter of right living.*

When we come to treat epilepsy as early, as broadly, as rationally and as persistently as we treat cases of tuberculosis, we will cure as many cases of epilepsy as we are curing of insanity to-day, that is, 25 per cent. to 30 per cent.

I regret that it is impossible for me to go into any details of any treatment on this occasion. The time is too short.

THE USE OF THE BIOGRAPH IN MEDICINE.[1]

By WALTER G. CHASE, M.D.,
BOSTON.

Before exhibiting to you the biograph pictures of pathologic motion, I wish to say a few words regarding the development of this most recent branch of photography. The first great advance over the wet-plate process was made some thirty years ago when the dry plate was invented. This made instantaneous work a possibility. The question then came as to how actual motion could be reproduced. Muybridge, twenty-five years ago, made the first successful experiment, and, as you will remember, startled the scientific world with his pictures of animal locomotion. For the production of these he arranged a series of cameras, each loaded with several plates, so as to take pictures of the subject from four different standpoints. By an electric apparatus these plates were made to expose at quick intervals while the subject was in motion. A series of prints from these negatives, when printed on a strip of paper and placed in a revolving cylinder, constituted an instrument called the zoopraxiscope, and reproduced in a limited way animal locomotion. These results were marvellous, considering the immature state of the science. Then Mr. George Eastman, of Rochester, commenced his experiments with the celluloid film, which has made photography practicable to every one. From the short length of film necessary for the kodak to the long biograph film was but a step.

Some months ago it occurred to me that the biograph might be advantageously employed to depict pathologic motion and

[1] Read by invitation, January 3, 1906.

as a valuable means of instruction. Several neurologists had carried out this idea regarding the reproduction of pathologic gaits, but as far as I have been able to find out no one has succeeded in taking motion pictures of epileptic seizures. The nearest attempt to this had been made by Dr. Dercum, of Philadelphia, who posed an artist's model for Muybridge, and I understand that an attempt had also been made at the Salpêtrière Hospital of Paris several years ago.

Of course, the first step necessary to carrying out my plan was to make myself master of the biographic processes, and the next step to find the necessary subjects. For the former the American Mutoscope and Biograph Company of New York kindly put their facilities at my disposal, and for the latter Dr. Spratling, of the Craig Colony for Epileptics, furnished me the necessary material for many of the pictures which I shall show you this evening. For many reasons these epileptic seizures are the most difficult form of motion to photograph. In the first place, it takes several minutes to set up and focus your biograph camera, and again, your patient is not always sufficiently obliging as to have his seizure out-of-doors in a suitable light and at a time when the sun is at its best, for an out-of-door light or a room with powerful electric lights especially arranged is absolutely necessary to give good results. In order to overcome these obstacles, we had some one hundred and twenty-five male patients from the infirmary assembled in a convenient spot out-of-doors on a warm summer day. The clothes were removed and the patients covered only with blankets, so that when a seizure occurred he could be readily dropped in front of the camera at the proper focal point, which had been previously marked. For background I used a large dark screen.

This piece of film which I show, and on which the negative is taken, is two hundred feet long and one and three-eighths inches wide, with the little sprocket holes in the sides by means of which the successive pictures are brought into view. Each picture is three-fourths of an inch deep by one inch wide, so you will see that there are fifteen separate pictures to each foot of film. On

one side of the camera is a gauge which indicates the number of pictures per second which are being taken, the ordinary number being fifteen to the second, but this can be varied according to your conditions of light. The length of the exposure can also be varied by the adjustment of a shutter, one-sixtieth of a second

Fig. 1

Fig. 2

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being the usual exposure. The film is not brought down before the lens in a continuous uninterrupted passage, but a slight pause is made to record each picture. For the reproduction of these pictures upon a screen it is necessary to make a positive print from this negative, which is run through a projecting apparatus set in front of the condenser of a stereopticon at just such a

distance before the crossing of the rays that the whole field is illuminated.

Having briefly sketched the method of operation, what is the practical application of this work?

First and most important, I would say, the record which has been obtained of rare cases. Take, for instance, the twenty-three epileptic seizures, including a case of Jacksonian and one of status epilepticus: for the production of these, fifteen hundred feet of film are necessary, and upon this is recorded a series of 22,500 separate and distinct pictures of epileptic attitudes. Any one of these may be enlarged separately or projected upon a screen, giving an opportunity to closely study and analyze the features and superficial muscles. For an example of this I reproduce a couple which have been enlarged from the film, and this leads me to speak of the educational feature. Many of you while lecturing on the effects of nervous disease have not been able to secure the proper clinical material at the time of your lecture. By the use of the biograph you have your illustrations at hand for use at any time in the lecture-room, and can run them over and over again to make your students familiar with the motions. You may explain time and again to the students the difference between the motions of a patient in an attack of chorea and epilepsy; but I will venture to say that the impression will be increased a hundred fold can he see these, one after another, in the life-like manner in which I present them to you. How many physicians in ordinary practice have seen the same number of grand mal seizures which I show you to-night, and so minutely depicted that you can see the tension of the muscles, the deep abdominal breathing, and even the saliva pouring from the mouth, which are all features of the attack? And this is not confined to epilepsy alone, but it is my ambition to secure a full set of films descriptive of all phases of pathologic motion, and I believe the time will come when each institute of medical instruction will secure its own set of biograph films and interchange with other medical schools, so that the valuable clinical material from all parts of the world may be at the dis-

posal of our students. In case the facilities of a school cannot make use of the biograph, the biogen may be used. This instrument is one with which you are all familiar, as seen in the one-cent vaudeville amusement-rooms. For these instruments a reel containing some one thousand prints is made from the negative film and revolved in the instrument under a powerful light, giving a remarkably good living-picture.

Then, again, you may have made up from these same films a series of pictures which are mounted in small book form, called a pocket biograph or thumb book, like the sample which I hold in my hand, and which by running the thumb rapidly over the leaves gives an accurate reproduction of an epileptic seizure. And, now, gentlemen, as I have some three thousand feet of film to run before you, I will not weary you with any more detail description of processes and applications.

DISCUSSION.

Dr. F. X. Dercum: The pictures referred to by Dr. Chase show the phases of an epileptic seizure. The subject was an artist's model, upon whom convulsions were artificially induced by the method described by A. J. Parker and myself about the same time, that of muscular excitation with the subject in hypnosis. The convulsions introduced artificially were as genuine as any form of convulsive movement and there was no idea of simulation on the part of the subject. I have induced them upon myself when I had more enthusiasm than wisdom, and have had no difficulty in inducing them on some of the group of young medical men who at that time attended the University clinics.

Dr. Chase: I am glad that Dr. Dercum exhibited these pictures. I have some 22,000 pictures which I am going to arrange in one of these biogens, or albums. They are pictures of various types, not only of epileptics but of hemiplegics and of various conditions of stigmata and trauma.

A CASE OF HEMORRHAGE FROM THE STOMACH DUE TO CIRRHOSIS OF THE LIVER IN WHICH GASTROENTEROSTOMY WAS DONE ON THE SUPPOSITION THAT THERE WAS GASTRIC OR DUODENAL ULCER.[1]

By WILLIAM J. TAYLOR, M.D.,

ATTENDING SURGEON TO THE ORTHOPEDIC HOSPITAL AND INFIRMARY FOR NERVOUS DISEASES, AND TO ST. AGNES' HOSPITAL; CONSULTING SURGEON TO THE WEST PHILADELPHIA HOSPITAL FOR WOMEN, ETC.

The patient was a man, aged forty years, of rather medium height and weight, whose family history was negative. There was no tendency to tuberculous or other constitutional disease, and he never had syphilis. He had always enjoyed good health, was a steady, hard worker in an office where he had large business responsibilities, and he took unusually good care of his health. He lived in the country, where he walked and rode a bicycle a good deal in the open air. He ate plain food, and never touched liquor or tobacco. About thirteen years before he had a severe attack of typhoid fever, with high temperature, but from this he made a complete recovery. His wife told me he had never been ill, and had never taken any medicine beyond an occasional dose of calomel for his liver, which at times had been torpid. He was dark brunette with rather sallow skin, but his three children have about the same color and appearance.

During the past summer he had great anxieties and business cares, involving much additional responsibility upon him. For this reason, he told me he had been particularly careful of his own health, lived on the simplest kind of food, had had special bottled milk brought to his office, which he drank between meals as a precaution against letting his health run down. He could not recollect having had the slightest indigestion or symptoms referable to his stomach.

On September 21st, he came to his home in the country at 10.30 in the evening, having been hard at work in his office in the city until late, and went

[1] Read February 7, 1905.

out to the toilet in the yard in an attempt to have a stool. He strained quite hard at stool, and then came in through the kitchen, which had been closed up and was very hot. He felt nauseated and picked up a basin, when suddenly he vomited a large amount of blood which, by actual measurement, was a quart and a pint.

His wife, hearing him come into the house but not in from the kitchen, went to look for him, and got to him just at the end of the vomiting attack. He was so weak that she put him down flat on the kitchen floor, and his pulse disappeared entirely from the wrist. Strychnine was given hypodermically and ergot. As luck would have it, his little daughter having been ill with typhoid fever, there was in the house and ready a sterile salt-solution with apparatus for intra-cellular infusion. This his wife, who is a physician, got at once and pumped into him one quart of the solution aided by a trained nurse who was already in the house, and then she summoned assistance. Undoubtedly he would have died from the loss of blood if this plan of treatment had not been instituted so promptly. Some of the saline solution was also injected into the bowel, and after its use brownish-red blood came away.

Conditions improved, and in about two hours he was lifted by two men and carried into the next room and laid flat on his back on a mattress on the floor. In less than a half hour he had another severe hemorrhage from the stomach, vomiting without effort one quart and a half pint of blood. His collapse was most profound, and Dr. Branson, who had been hastily summoned, and Dr. McCollin gave him strychnine and ergot hypodermically, and thirty drops of adrenalin (repeated in an hour) was given by the mouth. Morphine was also administered. His condition was so bad and his weakness so profound that they could not remove his outer clothing, and he was kept flat on the floor five days. He was seen at this time also by Dr. Musser, who advised that a gastroenterostomy be done. This was also advised by Dr. Branson, but Dr. John H. Gibbons, who saw him at the same time, was opposed to immediate operation.

At the end of five days he was taken to the Bryn Mawr Hospital and kept there under observation for two weeks. Nothing whatever was given him by the mouth and he was nourished entirely by the rectum. The bowel was irrigated with normal salt-solution, and tarry evacuations persisted until about the twelfth day, though growing much less in quantity towards the last as shown by the irrigation water becoming lighter brown in color.

Peptonized broth and liquid peptonoids were given by the bowel every six hours. Malted milk enemata were tried but were always expelled.

For two weeks he had no food by the stomach, and while the rectum retained the nourishment introduced into it, he became cross, irritable, and slightly delirious as the result of extreme hunger. He was taken back to his home on October 7th, where I saw him for the first time on October 9th. On this date an enema was given, and after some straining he complained

of distress and gas in the stomach and bowel. On inserting a rectal-tube to carry off the gas the end became covered with tarry material and on irrigation more was found. No food was given for twenty-four hours. The irrigations were brown-colored for five days.

He reacted well from this set-back, but the anemia was much more marked.

With cautious use of food by the mouth and rectal feeding his general condition improved very much and his color showed he was making blood fast.

On the morning of October 15th, he awakened his wife, who was lying asleep on the foot of his bed, to tell her that he felt very uncomfortable in his stomach—he had a feeling of distention and nausea. Almost immediately he vomited quite a considerable quantity of blood, and during the day he passed tarry material from the bowel.

This same day he was brought to the city in an ambulance where, after his arrival, he again vomited some little blood and had black, tarry stools.

On October 17th, Dr. Lewis saw him with Dr. McCollin and me in consultation. He was extremely pale, showing evidences of internal hemorrhage, although his pulse was fairly good. He had some edema of the feet, some fluid in the abdomen; but this we thought to be confined to the large bowel and was probably a collection of fluid blood. The heart's action, considering the profound anemia, was good. The kidneys were acting well, and the spleen and liver did not seem to be altered in size from the normal. His temperature was slightly above normal. He had vomited some little blood the day before, and had passed, and was passing, dark, tarry material from the bowel. His condition was so extremely grave that we decided it best to wait, if possible, for a few days before deciding upon operation, to enable him to regain the ground lost from this additional hemorrhage. He was given adrenalin chloride and strychnine, and nourishment by the bowel. On this date the following examinations were made of the urine and blood:

Urine, light amber, clear, no sediment, acid; specific gravity 1023; no albumin; no sugar; centrifugated specimen contains only a few leukocytes.

Blood. Polymorphonuclear, 58 per cent.; small erythrocytes, 32 per cent.; large erythrocytes, 4 per cent.; transitional, 4 per cent.; basophilia, 2 per cent.; macrocytes and microcytes present.

Blood. Hæmoglobin, 45 per cent.; coagulation time, three and one-third minutes.

Microscopic. Leukocytes, 2,400; erythrocytes, 1,280,000; no malarial organisms; Widal, negative.

The next day, October 18th, his general condition had decidedly improved. There had been no more vomiting of blood and no bloody stools. He did not appear so completely exsanguinated, although still very pale, and on the 19th, Dr. Lewis again saw him with me in consultation, when we found his color better, and he had gained in strength, but there was

still some œdema, which was general. For the past twenty-four hours he had taken some Valentine's extract by the mouth, as well as his rectal feeding. On that date, Dr. L. Webster Fox examined the eyes and found considerable thinning of the choroid coat and retina. There was visible the remains of a hemorrhage between the optic nerve and macula. There were enlarged bloodvessels in the neighborhood of the hemorrhage. There was also a high degree of myopia, for which he refracted him in 1898.

There was little or no change in the physical condition since the last consultation, two days before, and not quite so much liquid in the ascending and transverse colon.

October 21st, Dr. Lewis again saw him with me early in the morning and his condition had improved so much that we decided upon immediate operation, and for this purpose he was taken to the Orthopedic Hospital and carried directly into the operating room. His condition was such that it was not deemed advisable even to take him in the elevator upstairs to a bedroom. Ether was given him by Dr. George W. Spencer, and the skin of the abdomen was shaved and prepared after he was on the operating table.

An incision was made through the right rectus muscle and as soon as the peritoneum was opened there gushed out a large quantity of perfectly clear straw-colored fluid. This escape of fluid was so marked that everyone present who saw it immediately thought of the possibility of malignant disease and spoke of the necessity for a more careful examination of the abdominal cavity than a simple operation for gastric ulcer would ordinarily require.

It was almost impossible to relax the belly-wall without danger to his life from the anæsthetic.

The vessels of the stomach and omentum were much engorged and resembled a colored diagram of an injected subject. The stomach was now examined over its anterior surface, but no ulcer or induration could be detected. It was not dilated; indeed, it was smaller than normal. On the anterior or free border of the duodenum, about one and a half inches from the pylorus, was found a thickening of the gut wall about three-quarters of an inch in its longest diameter, almond-shaped, not circular, and much unlike the surrounding surface. It was distinct in outline, but not hard or indurated as would be the case in chronic ulceration, and this I took to be an acute ulcer probably the site of the hemorrhage. There were numerous very recent, easily separated adhesions about the duodenum, liver, and mesentery. The edge of the liver was examined by the finger and by sight, but nothing abnormal was distinguished, and the gall-bladder seemed normal. There was nothing unusual in the portal space, and the pancreas seemed to be of normal size and consistency. The omentum and colon were now lifted up, a slit torn in the mesocolon and, with the finger, the whole of the posterior surface of the stomach wall examined without finding any induration or evidence of ulceration. A posterior gastroenterostomy with a short loop was then rapidly

performed by Moynihan's method by clamps. Pagenstecher thread was used for both hemostatic and peritoneal sutures. The mucous membrane in the incison in the stomach and intestines was cut out with scissors. Owing to his weak condition and the profound shock caused by the operation, no effort was made to suture the slit in the mesocolon to the stomach wall, although this was quite large.

There was nothing unusual in the technique of the operation other than there was difficulty in pulling out the stomach sufficiently far to clamp it.

A pint of normal salt solution was introduced into a vein in his left arm, and he was given strychnia and atropine hypodermically.

He reacted nicely from the shock of the operation and did not vomit at all. Nothing was given by the mouth for seventy-two hours, but during this time he was nourished by the rectum. Salt solution was also given by the bowel.

On the morning of the third day he had three small stools, the fecal matter coming out through a rectal-tube; the first and second contained some few dark and very old blood-clots, mixed with the fecal matter, but from that time on there was no evidence of blood in the stools. There was no distention of the intestines nor disturbance of the stomach, and he was given first water and then Valentine's meat-juice, and for some days he was nourished in addition by the bowel.

On October 27th, the sixth day, as his pulse, temperature and respiration were normal, he was given some scraped beef, a soft-boiled egg and toast by the mouth, without any discomfort following.

His color steadily improved, and his strength increased, and on October 28th, or just one week after the date of operation, his blood showed 52 per cent., of hæmoglobin, 2,170,000 red cells, and 2800 white cells.

At the end of two weeks he was feeling perfectly well, was digesting all food most satisfactorily, and indeed the only articles of food which showed any appearance in the stools were two grapes which he had swallowed apparently without chewing, and these had slipped from the stomach into the bowel. He now had some œdema of the feet and ankles.

On November 7th, or three weeks after the operation, he was seen again by Dr. Lewis in consultation, when there was very marked œdema over the whole of the body, the feet, ankles, genitalia, chest-wall, and even the forehead and cheeks. He was passing only a limited amount of water, although his urine showed no evidence of disease of his kidneys.

Urinalysis, November 8, 1905. Macroscopic: light yellow, cloudy; slight flocculent sediment; acid; specific gravity, 1017; no bile; no sugar; faint trace of albumin. Microscopic: Centrifugated specimen contains a great quantity of calcium oxalate crystals and leukocytes, a number of epithelial cells.

The abdomen was distended by fluid, so much so that his binder had to be let out several inches, and on a careful physical examination by

Dr. Lewis free fluid was found in his plural cavities, particularly so on the right side. At this time his blood-count had improved. His spleen did not appear to be enlarged, neither did his liver seem to be contracted, although on this one point I have not a note made at the time; but the impression of Dr. Lewis and Dr. McCollin, as well as my own recollection, all go to show there was no apparent diminution in the size of the liver. As the œdema was very marked we all were fearful of some form of obstruction to the portal circulation.

We therefore agreed that diuretics, in the shape of Basham's mixture with strychnine, and careful feeding would be the best plan of treatment, and considered that the œdema could be accounted for by the extreme poverty of his blood. His urine, which had been scant, increased under this plan of treatment by leaps and bounds until he was passing from eighty to ninety ounces of urine in twenty-four hours. The œdema rapidly disappeared and the fluid apparently left the abdominal cavity, and he steadily improved in health and strength.

At the end of three weeks he was allowed to sit up in bed, and to go out and about in a little over four weeks. An examination of the blood showed: hæmoglobin, 55 per cent.; red cells, 2,810,000; leukocytes, 4,800; cells were of good shape and size.

All this time his color was improving; he was eating and sleeping well, digesting his food perfectly, and his stools were normal in appearance and color. He became so well and strong that it was impossible to keep him away from his office, to which at the end of seven weeks he insisted upon going with regularity, but keeping short hours and doing only a small amount of work.

On December 27th he came to my office. He had gained in weight, which was now one hundred and fifty-one and one-half pounds, his normal weight. All œdema had been gone for weeks, and he had gained in strength. He was going to his office each day for a few hours and simply assuming direction of the work without doing any hard work himself. His digestion was perfect. A careful examination of the abdomen showed the scar to be in good condition and there was no distention of the abdomen, and I did not detect any marked diminution in size of his liver nor enlargement of his spleen, nor did the superficial abdominal veins seem unduly prominent. He told me he had eaten a somewhat hearty and injudicious Christmas dinner, but that he had felt no ill effects from it. He did tell me, however, that he had had some dark stools, not the black stools seen so commonly in persons who are taking iron as he was doing, but they were brownish-black. Several of the stools were not homogeneous as to color, but were partly dark and partly light. These dark and partly colored stools had somewhat alarmed his wife, and he came to see me largely to tell me about them and to relieve her anxiety. His general condition was so satisfactory that I must confess I did not attach very much importance to this symptom, and advised him

merely to take food between his meals, to be careful as to the amount which he ate at any one time, and suggested that he eat only a few articles at each meal.

He did not feel well January 1, 1906, and his wife noticed that he was paler than usual, and complained of discomfort in his stomach, but came into town after eating a simple breakfast and went to his office, where he remained until 2 P.M. He spent the remainder of the day at the home of a relative, but ate little and slept most of the afternoon, and then returned to his place in the country. He walked from the station to the house, about a half a mile, and went to bed about half past nine o'clock.

A little after midnight he awakened his wife, saying that he felt nauseated, and started for the bath-room, but fell at the bed-room door unconscious and pulseless. Almost immediately he passed by the bowel a large amount of blood, which was dark and contained numerous clots. In a few minutes he regained consciousness, called for a basin and vomited a large quantity of dark blood and some few clots, showing that the bleeding must have been going on for some hours at least. The total amount of blood lost by the bowel and from the stomach must have been even greater than at the time of his first hemorrhage in September. I saw him in about four hours, when his pulse was 96, full, quite strong, and of good volume. He was perfectly conscious but extremely blanched in appearance and was sweating profusely. He had no more hemorrhages that day and passed a very good night, but about eleven o'clock he had another hemorrhage which was bright red in color, but contained also a few old currant-jelly like clots. He was very much blanched in consequence of this hemorrhage but reacted very well from it, and his pulse, while rapid, had a good volume.

I saw him in consultation with Doctors McCollin, Branson, and J. H. Gibbons on January 3, at five o'clock. His pulse was very fair but he looked terribly pale; his abdomen was scaphoid, with no distention whatever; there was no enlargement of the spleen that could be detected, but his liver dulness was greatly diminished—so much so that it did not come anywhere near the edge of the ribs. There was no distention of the abdomen nor any possibility of the intestine floating over the edge of the liver and thus obscuring its outline. Certainly there was some condition present producing portal congestion, and Dr. Gibbons and I both believed him to be suffering from an acute cirrhosis of the liver.

On January 4th, Dr. Lewis saw him with us again in consultation, and now the diminished size of the liver was apparent, but not so easily demonstrated as the day before, for the large bowel was filled with blood. Early on the morning of January 5th, he had another hemorrhage and steadily grew worse, bleeding constantly from the bowel until he died on the night of January 6th. On this day a blood-count showed: hæmoglobin, 14 per cent.; red cells, 1,300.000; white cells, 16,000.

The great interest in this case centres, of course, in the diagnosis and in the probable cause of the development of cirrhosis of the liver. Here was a man forty years of age, who had lived a most simple and exemplary life, and who had never taken alcohol in any form, had never had syphilis, nor any tendency either inherited or acquired to tuberculosis or other constitutional disease. At the time of operation, as soon as the peritoneum was opened and the clear serum gushed out, doubt as to the accuracy of the diagnosis of acute ulcer of the stomach was at once entertained by all present, and for this reason a more careful, although very rapid, examination was made, by sight and touch, of all of the organs within easy reach. The edge of the liver was seen and it did not present any gross changes such as would have suggested cirrhosis, and the finger passing over its anterior surface did not detect any roughness. The other organs were normal in size and consistence, as has been said in the former description; but I thought, and indeed those present believed with me, that there was a distinct ulcer on the free border of the duodenum about one and one-half inches from the pylorus. Here was a spot, a little less than an inch in diameter and rather oblong in shape, which was different in color from the surrounding gut; it was indurated, and in grasping it with the fingers gave the sensation of thickening of the intestinal wall such as is noticed in the very early stages of ulceration of the intestines in typhoid fever. There was, however, no marked induration, such as would have been present if there had been an ulceration of long standing, and not only my assistant, Dr. Macy Brooks, but Dr. Morris J. Lewis, also agreed with me in thinking that this was probably the site of the hemorrhage. The examination of this place in the gut after death did not disclose any true ulceration; all induration and thickening had disappeared, but at this point the mucous membrane seemed somewhat less thick and its surface had a slight difference in appearance from the surrounding mucous membrane. This was certainly not a healed ulcer. Indeed could not have been an ulcer at all; but it must have been an area of hyperæmia which,

if the gastroenterostomy had not been performed, would soon have become an ulcer. It is possible, however, that this might simply have been a muscular spasm of a limited portion of a wall of the gut.

The operation of gastroenterostomy was of the most signal benefit by providing drainage for the stomach, thus greatly lessening the local congestion and consequent hemorrhage which, up to that time, had been present.

He was able almost immediately to digest freely a variety of foods in normal amount, and all hemorrhage, both by mouth and bowel, ceased at once.

The omentum attached to the parietal peritoneum directly beneath the scar in the belly-wall was most happy in its effects; the large bloodvessels in it permitted the portal stasis to be greatly relieved, thus accomplishing exactly by accident that which is attempted in Talma's operation.

Our error in diagnosis was very great, but the results accomplished in respect to comfort to the patient—ten weeks of perfect relief from all hemorrhage and discomfort—undoubtedly atoned in some measure for our mistake.

The details as to the differential diagnosis between this and other forms of portal congestion and the various forms of ulceration of the stomach and intestines must be left largely to the medical diagnosticians in consultation in the case; but I personally did not give sufficient prominence in forming my diagnosis to the sudden and violent hemorrhage occurring without any antecedent symptoms of disorders of digestion, and without there being any pain either before or after its occurrence. While the absence of pain and the sudden overwhelming hemorrhage are all in favor of portal obstruction rather than definite ulceration, yet many cases of acute ulceration are reported by Moynihan and other writers of large experience where all symptoms referable to the stomach have been wanting.

This somewhat lengthy report is made in the hope that much may be gained in the discussion of the details of this extremely interesting case, and because we have been most fortunate in

having had an autopsy made by such an expert pathologist as Dr. W. T. Longcope. I wish to thank him again for the most careful and painstaking manner in which this examination was made. These notes of the autopsy were taken at his dictation and I also present his report of the examination of the stomach, which he made after a careful study of it in his laboratory.

POSTMORTEM PERFORMED BY DR. LONGCOPE.

Anatomical Diagnosis: Atrophic cirrhosis of liver; enormous dilatation of veins along greater curvature of stomach near cardia, with erosion of mucous membrane of stomach and hemorrhage; gastroduodenostomy; adhesions between omentum and anterior parietes; slight ascites and right-sided hydrothorax; splenic tumor with chronic interstitial splenitis; anæmia of all organs; œdema and congestion of lungs.

The body is 168 cm. in length, with very marked rigor mortis. There is very slight postmortem lividity over dependent parts. The mucous membranes and skin surfaces are exceedingly pale, and there is slight œdema of the forehead and a suspicion of œdema of the ankles. On the right side of the abdomen to the right of the middle line there is a linear scar 12 cm. in length, extending up from the imbilicus; it is completely healed. Upon incision the subcuticular fat is present in fair amount, light yellow in color. The muscles of the thorax are quite red; those of the abdomen much paler. On opening the abdominal cavity the omentum is found to be adherent to the anterior parietes immediately beneath the abdominal wound and for some distance to the right of it. The adhesions are of fat and contain a number of bloodvessels, some of which are almost as large as a match-stick. The area of parietal peritoneum covered by adhesions measures 7.5 cm. in length by 6 cm. in width. The liver is just visible to the right of the xiphoid cartilage. The urinary bladder is greatly distended. The abdominal cavity contains a small quantity of almost colorless, clear fluid. The intestines are bluish-gray in color, distended, and the serous surfaces are everywhere moist, smooth, and glistening.

Thorax: The lungs are voluminous and meet in the middle line. The left lung is bound to the chest wall by numerous delicate fibrinous adhesions. There is no fluid in the left pleural cavity; the right pleural cavity contains about 200 c.c. of very pale, clear fluid. The pericardial cavity contains a slight excess of clear fluid. The serous surfaces are smooth and glistening.

Heart: The epicardium is smooth; there is a moderate amount of fat; the cavities contain pale, firm clots and fluid blood; the muscle is exceedingly

pale and yellowish in color, rather soft. The left ventricle is about 10 to 12 mm. in thickness. The valves are normal with faint thickening at the base of the aortics. The coronary arteries are delicate and patulous. The aorta is smooth and rather narrow.

Lungs: The left lung is very large and heavy. The pleura is covered with fibrous tags. There are small hemorrhages over the pleura. On section cut surface oozes quantities of frothy fluid. The surface is smooth, pale pink; air is present throughout. Bronchi at root contain frothy fluid; vessels clear. The right lung is exactly like the left, except that the pleura is free from fibrous adhesions.

Spleen: The spleen measures 17 x 11.5 x 6.5 cm. and is much enlarged, very soft, exceedingly pale, pinkish mottled with purple. It is regular. The capsule is much thickened but free from adhesions. The pulp is exceedingly pale, very soft, with extensive coarse reticulation. Between the reticular bands the pulp is depressed and the spaces seem only partially filled. There are adhesions between the gall-bladder and hepatic flexure of the colon, so that the gall-bladder and hepatic flexure are covered by a continuous coat of peritoneum. All the vessels are normal in the portal space.

Liver: Weight, 1070 grams; size, 23 x 14 x 9 cms. The liver is quite small, slightly irregular, and very firm. The capsule shows some irregular thickening and through it injected bloodvessels are seen. There are no adhesions. The superior surface is finely granular. The inferior surface is much more coarsely granular and in places there are deep pittings. The color is a tawny yellow. On section the cut surface is rough and presents a very irregular, coarsely granular appearance, producing an artificial lobulation. The color is tawny yellow. Between the lobules there are tiny depressed lines, pinkish in color. The portal connective tissue is much increased and filled with small injected bloodvessels. Many of the bile ducts are also injected with bile. The gall-bladder is fairly large; posteriorly it is covered by adhesions. It contains thick, dark-green bile; bile ducts patent.

Kidney: Size of left, 11 x 5.5 x 4 cms. The kidney is of medium size, regular, and decreased in consistency. The capsule strips well, leaving a smooth, pale, yellowish-gray surface. On section cut surface shows great pallor. Cortex and medulla in good proportion. Medullary pyramids regular and pale pink. Cortex regular, pale yellowish; striæ very poorly seen, but when visible appear regular. Glomeruli invisible. Cortex about 5 to 7 mm. in thickness. Pelvis apparently normal.

Urinary bladder, prostate, testes, and *seminal vesicles* not examined.

Stomach: The stomach is fairly large. At a distance of 8 cm. from the pylorus an anastomosis is found between the stomach and a loop of duodenum, a few cm. from where it enters the peritoneal cavity. The point of anastomosis is on the posterior wall just posterior to the attachment of the

omentum to the greater curvature. All about the line of anastomosis there is much fat, which is attached to the wall of stomach and doudenum and hides the line of anastomosis. On opening the stomach much dark brownish-black grumous fluid escapes together with some blackish blood clots. The mucous membrane is pale, thin, and shows towards the fundus some mammillation. The opening between the stomach and duodenum is beautifully smooth, the edges are round, and one can scarcely tell where stomach mucosa stops and mucosa of doudenum begins. A suture still hangs free from the line of anastomosis. There is a loop of tough black string 6 cms. in length. The ends of the loop emerge from exactly opposite sides of the wound and hang free in the stomach. Attached to the dependent part of the loop there is a mass of soft greenish-black material about the size of an almond, but with stringy margins, looking something like a bunch of seaweed. On the peritoneal surface of the stomach, along the greater curvature and about 5 cms, from cardia, there is a bunch of tortuous, enormously dilated veins, which cover an area about 7 cm. in diameter. They are collapsed, but some of them seem as large as one's thumb. The mucous membrane and wall of the stomach covering them are exceedingly thin and the tortuous vessels show through the mucous membrane and appear to run in a ring 5 cm. in diameter. At one point over the veins there is a tiny erosion in the mucous membrane about 2 mm. in diameter. On injecting the veins with Berlin blue the coloring matter escapes from this tiny erosion but from nowhere else in the mucous membrane. About the cardiac end of the œsophagus there is another small varix. The largest single veins here are about the size of a slate pencil. Fluid injected into these veins does not escape through the mucous membrane. The veins anastomose with the vessels along the lesser curvature of the stomach. The splenic and mesenteric veins are enormously dilated and show many anastomoses.

Duodenum: The duodenum is apparently normal. The mucous membrane of the first portion is delicate; there are no scars or ulcers.

Pancreas: Apparently normal. Other organs not examined.

Histological Examination. Heart: There is a good deal of fat in pericardium. The myocardium is œdematous; in patches the fibres show a fine fatty degeneration. The striæ are not well marked and there is much fragmentation.

Spleen: Chronic interstitial splenitis. The capsule is thickened. The pulp spaces are empty and collapsed. There is a marked general increase in connective tissue with great thickening of the trabeculæ and thickening of both media and intima of bloodvessels. The Malpighian bodies are very small and in them, too, there is an increase of connective tissue.

Liver: Interlobular cirrhosis. There is a marked increase of connective tissue of portal spaces, cutting the section into coarse lobules. This is very slightly cellular and there is slight, if any, increase in bile ducts. The liver

cells are generally granular and show some fatty degeneration. In certain localized areas the liver cells are very large, pale, finely granular and contain sometimes 2 to 3 nuclei. The capillaries about the central veins are large but empty.

Kidney: Extensive degenerations of epithelium. There is some slight increase in connective tissue of cortex. The tubular epithelium shows the most extreme grade of degeneration in patches. The cells are granular, frayed, often desquamated, and the nuclei refuse to stain. Sometimes the tubules contain large fat droplets. The ascending loops of Henle are particularly affected. There is no cellular infiltration.

Dr. R. B. Preble, of Chicago (*American Journal of the Medical Sciences*, March, 1900, page 263), has collected sixty cases of fatal gastro-intestinal hemorrhage due to cirrhosis of the liver, all that had been reported in literature up to that date. The most common cause was varices of the œsophagus. In the great majority of the cases the cirrhosis was atrophic. In one-third of the cases the first hemorrhage was fatal, and in the other two-thirds the hemorrhages continued at intervals over a period varying from a few months to several years, the maximum time being eleven years. His conclusion, from a careful study, is that in one-third of these cases the diagnosis can be made at or before the time of the first hemorrhage; in the other two-thirds the diagnosis cannot be made at all, or only after months or years, during which time other symptoms of cirrhosis have developed.

Œsophageal varices were present in 80 per cent. In only 6 per cent. of those cases which showed œsophageal varices was the cirrhosis typical.

One death was due to erosion of the veins in the stomach near the cardia. He states that these veins in the cardiac end of the stomach are part of the portal system, while those of the œsophagus are part of the systemic system; that they connect by anastomotic branches, which as a rule are too small or too few to contribute much to the formation of a collateral circulation when the portal system is obstructed; when, however, the anastomosis is free they become an important factor, and their dilatation may so completely compensate for the veins obstructed in the liver that the clinical course of the case is altered and obscured.

The compensation may be so complete that all of the clinical symptoms upon which a diagnosis of cirrhosis of the liver must depend, namely, the splenic tumor, the ascites, and the subcutaneous abdominal varices, are wanting, and the patient, while apparently in good health, dies suddenly from hemorrhage from the stomach. Hemorrhage was the first and only symptom in ten out of thirty-five of these cases. Two cases which he mentions, a man of forty-five and a woman of twenty-two, were both perfectly temperate in their habits, with no previous history of any predisposition towards cirrhosis, and in both of these a diagnosis was made of ulcer of the stomach, but the autopsy demonstrated that the stomach and intestines contained no leisons whatever.

PERFORATION OF DUODENAL ULCER; OPERATION AND RECOVERY.[1]

By J. H. MUSSER, M.D., and EDWARD MARTIN, M.D.

MEDICAL REPORT BY DR. MUSSER.

Patient. E. C., aged thirty-nine, white, American, manager of railroad, was admitted to the University Hospital September 25, 1905, and was in profound shock and suffering much pain when seen by my resident physician, Dr. Keen, to whom I am glad to express my indebtedness for the notes, and the care and skill in attendance on the patient.

Previous Medical History. For the past nine or ten years the patient has been a constant sufferer from "gastric hyperacidity." During this time he was under constant medication and restricted diet. Five years ago he was operated on for appendicitis.

History of Present Illness. For five days before admission to hospital he suffered from gastric hyperacidity and vomited several times during the day, the vomitus consisting chiefly of highly acid mucus. He obtained relief from alkalies, such as sodium bicarbonate. The day he was admitted to the hospital he was feeling better, and at 12 M., for luncheon, he ate a squab and a plate of soup, and drank a quart of Apollinaris water, which is more than he had taken since the onset of this recent attack. He felt perfectly well until 5 P.M. on the evening of admission, when on attempting to enter an automobile he was suddenly seized with agonizing epigastric pain, so severe as to cause him to scream and to double him over. He was taken at once to a drug store, where sodium bicarbonate was given, but without relief. He then came to the hospital about forty-five minutes after the onset of the attack. During the day he had had a good bowel movement resulting from Hunyadi water taken in the morning.

Conditions on Admission. At 6 P.M. temperature was 97: pulse 72; respiration, 24. He was pale, markedly dyspnœic, and suffering intense abdominal pain chiefly in the epigastrium; the pain was also referred to the back, between the shoulder blades, and to the right shoulder. The pain

[1] Read February 7, 1906.

was so severe that it was impossible for him to lie quietly, causing him to toss from side to side in bed, with his knees drawn up. On account of increase in pain it was difficult for him to breathe and impossible for him to take a long breath.

Examination. On examination the abdomen was found to be markedly scaphoid in shape; extreme general and cord-like rigidity were present. Not a click of peristalsis could be heard. Tenderness was more or less general over the whole abdomen, but the point of most acute tenderness was about the size of a dollar, situated in the right midclavicular line, just below the costal margin, where even the slightest touch would cause agonizing pain. If any difference could be differentiated, rigidity was more marked in this locality.

Preliminary Treatment. After the examination was made, morphine $\frac{1}{4}$ grain and atropin $\frac{1}{150}$ grain were given, and in about five minutes the patient was seized with vomiting, which was gushing in character, very profuse (about three pints), and consisted of undigested food and clear mucus, with no microscopic blood. The pain was relieved somewhat by vomiting, and the man was able to breathe more deeply. In about forty-five minutes anodyne had relieved the severe pain and he was much more comfortable. He had no more attacks of nausea or vomiting until 10.30 P.M., when he again became nauseated, but could not vomit, and the epigastric pain began to reassert itself. During the entire time the rigidity remained the same, and peristalsis could not be elicited. Simple enemata were given, but were ineffectual; under the opiate general abdominal tenderness seemed largely to subside, and the point of acute tenderness shifted a little to the left.

Examination of Gastric Contents. On examination of the gastric contents no blood was present to the naked eye or revealed by the occult blood test. The gastric contents were highly acid, but not of a foul odor.

Blood Count. At 8 P.M., red blood corpuscles, 11,200; at 9 P.M., red blood corpuscles, 16,000; at 10 P.M., red blood corpuscles, 14,680.

Temperature, Pulse, and Respiration. At 6 P.M. temperature was 97.1°; pulse, 72; respiration, 24. At 8 P.M. temperature was 98.2°; pulse 90; respiration, 22. At 10 P.M. temperature was 99°; pulse, 108; respiration, 24.

Diagnosis and Operation. The diagnosis of duodenal ulcer was made and an operation was performed at 11 o'clock by Dr. Martin. An ulcer was found on the posterior wall of the duodenum, just beyond the pyloric orifice of the stomach. The perforation was about the size of a pinhead. There was extensive peritonitis.

The operation of inclusion with fastening of the omentum over the ulcer was done. The inflammation of the peritoneum was too violent and progressive to admit of prolonged operation. (See the remarks of Dr. Martin.)

A rapid recovery followed, and to this day (February 1) the patient is without symptoms.

These facts present all the features of the case up to the time of operation. In review it may be said that I saw the patient about 6.45 P.M. on the day of admission. There was evidently commencing peritonitis due to perforation of some hollow viscera, presumably the duodenum. Time for further brief observation to note the progress of the pulse, the temperature and the leukocytosis was admissible. Hourly reports were given me, and at 10 P.M. I requested Dr. Martin to see him with me and, if he concurred, to arrange for operation.

The diagnosis of duodenal ulcer was made because the pain during his many years of suffering did not take place immediately after food, indeed was often relieved by food; because hematemesis was absent; because there was no vomiting after food, and because of the location of the greatest pain, tenderness, and rigidity.

The diagnosis of perforation was based on the history of the case and the mode of onset of the acute symptoms, pain and shock; the situation of the greatest tenderness and rigidity; the pain in the back, and the occurrence of acute peritonitis. The pain in the back indicated a posterior perforation. The dyspnœa was apparently due to an overloaded stomach and to pain and rigidity.

The diagnosis of peritonitis was made because of the presence of a very probable cause, *i. e.*, perforation of some hollow viscera; because of the local and then diffused pain, the rigidity, the progressive rise in the temperature and pulse, and the leukocytosis.

The interesting feature of the case is the fact that if there ever was a person whose gastric symptoms might have been deemed a neurosis this patient was of such type. He was of neurotic temperament; his business invited such a state; he smoked to excess; was accustomed to the use of stimulants, and led a social life not conducive to an equanimity of function proper for digestion. At no time were there any objective signs to suggest ulcer. The character of the stools had not been studied before the onset of acute symptoms, and hence no statement

can be made as to the occurrence of intestinal hemorrhage. It is true the hyperacidity from which he suffered was in all probability the causal factor in the production of the ulcer, and this in turn might have been the product of a neurosis. Against a neurosis, his habit of indiscretion and heedlessness as to the mode of eating, time of eating, and character of food count for much, so unlike the timid, finicky, and apprehensive neurotic subject.

Because of the absence of the symptoms of lesion it behooves one not to put too much stress on the other leg and to allow temperament to be too serious a factor in diagnosis. The same may be said of the duration of the disease. Long duration does not rule out organic lesion.

I have had the privilege of reporting to the college two other cases of perforation of duodenal ulcer with operation and recovery. The first patient was operated on by Dr. Wharton, December 18, 1900. This patient is in excellent health, free from gastric symptoms and of greater weight than ever. The operation of inclusion was done. Much the same may be said of the second patient, a woman operated on by Dr. W. W. Keen, November 26, 1903. She has no gastric symptoms and is much heavier than before the operation. Dr. Keen sewed up the ulcer and performed a gastroenterostomy with a Murphy button. Somewhere within the abdominal cavity that button still lingers. There is every indication that it is in close proximity to Nature's button, and that it makes itself known, notwithstanding the incompatibility of age, by those sensations which are not incomparable to those of the expectant mother.

SURGICAL REMARKS BY DR. MARTIN.

The accurate diagnosis made the surgical procedure in the case comparatively simple.

Of all the symptoms the one which most clearly indicated the need of immediate operation was the increasingly rapid pulse, which in four hours had run from 72 to 108. The leukocytosis was not progressive. The perforation was found without difficulty

and was bathed in stomach contents, which had gravitated mainly downward and to the right into a pocket formed by adhesion of the cecum and ascending colon to the parietal peritoneum in front. Into this pocket a drainage tube was passed through the loin and from it drained about an ounce of turbid mucus. Thereafter there was no further discharge from this tube. At the seat of ulceration there was a ring-like induration about the entire duodenum, forming a distinct stricture. Inversion of the opening was readily accomplished by Lembert sutures, the line of which was further reinforced by a strip of omentum. There were no signs of adhesive inflammation even on the part of the omentum, nor were there evidences of extravasation downward and forward into the pelvis.

A drainage tube was carried to the region of the foramen of Monro, and the wound was closed by large sutures.

Barring an attack of left-sided pleurisy, which strongly suggested an inflammation at the lesser omental cavity, convalescence was uneventful.

DISCUSSION.

Dr. S. Mason McCollin: I have knowledge of two members of the same family, an aunt and grandmother, who suffered from cirrhosis of the liver. One had a large hemorrhage and was in the Johns Hopkins Hospital. The other case also had hemorrhage and died from cirrhosis of the liver.

Dr. D. J. Milton Miller: The paper of Dr. Taylor is of special interest from the standpoint of diagnosis. Gastric hemorrhage in cirrhosis of the liver, in the suddenness of the onset and other symptoms, resembles so closely many forms of gastric ulcer that, in the absence of the ordinary signs of cirrhosis, the diagnosis is well-nigh impossible. I recall a case seen several years ago in which the resemblance was most marked and deceived the very elect. A lady about forty years of age who had suffered for years from rheumatism was seized one night with intense vomiting. This was so exhausting that she fainted, and in the morning it was found that she had vomited about seven quarts of blood. She was treated for eight weeks by two of our most prominent diagnosticians for gastric ulcer. As a result of the first going out she contracted pleuritis and pericarditis, from which she died in about five

or six weeks. The autopsy was made by Dr. Riesman, who found a high degree of cirrhosis of the liver and a varicose condition of the gastric veins in the neighborhood of the cardia and the lower part of the œsophagus, just as was revealed in Dr. Taylor's case. The patient was a woman of the most exemplary habits, and there was nothing in the previous history to suggest this condition of the liver. There had never been any gastric symptoms, ascites, enlargement of the liver or spleen or of the cutaneous veins; the collateral circulation through the œsophageal and epigastric veins had evidently been perfect. That the diagnosis between the two conditions is extremely difficult is shown by these cases.

With the occurrence of sudden, very profuse, gastric hemorrhage, as we are so apt to have in gastric ulcer, we ought to think of the possibility of cirrhosis of the liver, and make every attempt to eliminate that factor by examination of the gastric contents, by examination for occult blood in the feces, and by the employment of every other means at our command; and even then we may remain in doubt. The differential diagnosis of the hæmatemesis of cirrhosis of the liver and that of gastric ulcer is a question of very practical importance, and not merely one of academic or scientific interest; the prognosis is quite different in these conditions.

Dr. James Tyson: It is well known that cases of gastric ulcer terminate fatally by hemorrhage when the ulcer has never been suspected. It also happens that cases precisely like this occur when cirrhosis of the liver is unsuspected, so that it becomes, in settling the question a matter of probability purely. Given, however, a case like this, the one reported without the presence of symptoms suggesting gastric ulcer, I think we will be right in the majority of cases should we guess (for that is what it amounts to) that it is a case of cirrhosis of the liver; because a diagnosis based upon scientific reasoning is practically impossible in a certain number of cases.

Bearing upon Dr. Musser's case, I saw within the last ten days with Dr. Griffith a case which Dr. Musser also saw at an earlier stage of the illness. The man was in apparently perfect health; an athlete taking excellent care of himself. He was taken on Wednesday afternoon with a mild chill; later developed some abdominal discomfort and nausea without vomiting. Dr. Musser examined him most thoroughly without finding any evidence of pneumonia. Albuminuria in moderate amount and casts were found He however improved so much that on the following Saturday he was regarded as convalescent. Early Sunday morning I was asked to see him in consultation, because suppression of the urine had been added to the previous symptoms. I think there was no blood in the urine. It was evident however that the case had become, or was primarily, one of nephritis. I saw him about ten o'clock Sunday morning and a rather guarded prognosis was made because of the suppression of urine. He had been catheterized and only about two

ounces of urine removed and subsequently none. Between twelve noon Sunday and five o'clock there supervened a complete change of symptoms. He fell in collapse and the pulse was thready. I found him at five o'clock in a desperate condition. Something had happened to produce a condition of shock, presumably a perforation or rupture in the abdomen. He could not have appendicitis because his appendix had been removed several years ago. There were no symptoms of peritonitis. He died at seven in the evening. Dr. Harte saw him in consultation from the surgical side a short time before he died. The most reasonable conclusion was that there had been a perforation, possibly from rupture of a duodenal ulcer.

An autopsy was made by Dr. Longcope. It was evident that the man had peritonitis, but unfortunately he had been so treated by the undertaker in embalming that it was impossible to decide upon a lesion. Further study of the specimens by Dr. Longcope probably cleared up the case. He is present and will perhaps be able to give the information which we so much desire.

Dr. Warfield T. Longcope: I studied the duodenum and stomach carefully and found one ulceration which could be distinguished fairly well from the artificial perforations. The former had oval and round margins, but the artificial perforations in the duodenum and stomach were irregular and jagged. Sections are being made and the diagnosis will be certain. I think there certainly was a perforated ulcer of the duodenum resulting in in general peritonitis.

Dr. John B. Roberts: It seems to me that the point of special interest in Dr. Taylor's case is that after the operation there occurred adhesion of the omentum to the belly wall, making what might be called an unintentional attachment of that organ to the belly wall, such as we do for cirrhosis of the liver. It will be of interest if, when Dr. Taylor closes, he will give us any result which he thinks may or may not have occurred following this unintentional Talma operation.

The case of Dr. Musser shows that when we have cases of hemorrhage which are doubtful we should open the belly and examine the liver for cirrhosis, as well as the stomach and duodenum for ulcer. I, myself, was much shocked a year ago that I postponed operation for ulcer of the duodenum until "the day after to-morrow," and had perforation occur earlier than I expected. I think it is better to go ahead and do what seems to be indicated, even if we sometimes operate unnecessarily. I see no reason why we should not make the operative examination.

Dr. Edward Martin: In the case reported by Dr. Musser diagnostic symptoms were all present. There were sudden agonizing pain, shock, and fall of temperature, followed by hurried pulse and local tenderness and rigidity; moreover, there was a preceding history of gastric ulcer. There was also albuminuria, which is a distinct symptom of beginning

peritonitis and may precede all other symptoms. In this particular case the pain was not only anterior, but referred to the back. There was a moderate extravasation of the contents of the stomach, which, because of a previous operation and some adhesions, had gravitated to the right lumbar region. Drainage was inserted at this point. The patient subsequently developed severe pain at the base of the left chest posteriorly, elevation of temperature, and a moderate pleural effusion, strongly suggesting the presence of a peritonitis developing in the lesser omental cavity.

From the diagnostic standpoint the cases which are most deceiving are those in which the parietal peritoneum is not involved. It is possible to have a septic peritonitis with no pain, no rigidity, and no tenderness. The only symptoms are those of septic absorption and some albuminuria which is likely to become more pronounced as the absorption increases.

Dr. S. S. Cohen: Bearing on the difficulty of diagnosis between sudden hemorrhage from gastric ulcer and sudden hemorrhage from latent cirrhosis of the liver, I recall a case at the Philadelphia Hospital of a man admitted after a sudden and profuse gastric hemorrhage, who gave a history of alcoholism over a number of years and absolutely no history of gastric distress of any kind. He was a carpenter and had never had to cease work by reason of illness.

Balancing the probabilities in the case, which was all we could do, the location of tenderness and the complete symptomatic silence of the liver led to the tentative diagnosis of gastric ulcer rather than cirrhosis of the liver, which was the alternative considered. There was nothing to suggest perforation. The surgeons who saw the case declined to operate, because of the profound prostration. Death occurred after a second and more violent hemorrhage. At the autopsy there were found some thirty erosions and ulcers of the stomach; all but the largest and most recent were cicatrized. In this case I personally inquired very carefully, not only of the patient but of his family, as to symptoms or complaints previous to the hemorrhage, but could elicit nothing. More delicately reared persons might have paid greater attention to gastric distress, as we can scarcely believe that no disorder was present.

In many cases we must guess more or less happily; and in such cases surgical exploration is entirely proper, in the absence of any obvious contraindications.

I cite the case, however, merely to show that the diagnosis in the case reported was entirely justified, and that failure to obtain a history pointing to the stomach does not necessarily mean that the liver is at fault.

Dr. William L. Rodman: The reports of two cases are most interesting. Dr. Taylor has, I think, reached the conclusion that others have done, that it is practically impossible, in at least one-third of the cases, to make

accurate differential diagnoses between gastric ulcer and cirrhosis of the liver. Preble's paper of 1900 emphasizes this fact.

The one point in connection with Dr. Taylor's case is the advisability of doing gastroenterostomy in a case where cirrhosis of the liver is unquestionably diagnosticated. I am far from criticizing Dr. Taylor for his operation in this case, for I am sure I would have done the same thing. It is very evident from a study of the literature that gastroenterostomy for cirrhosis cannot reasonably be expected to do the same amount of good, and does not do the same amount of good, as it does in gastric ulcer. We all know how difficult it is to control hematesis in cirrhosis, or to arrest epistaxis in cirrhotic patients. The blood is so thin that it will not coagulate. If one has made an accurate diagnosis of cirrhosis it is usually best not to do so serious an operation as gastroenterostomy. Dr. Taylor, however, has reviewed the case from that standpoint.

Dr. Musser's case is interesting and he is to be congratulated upon the accurate diagnosis, inasmuch as we know that duodenal ulcers are not particularly common in women at any age, and very uncommon in women so young as the patient reported.

The best diagnostic point undoubtedly is the one which he makes: the deferred pain—three or four hours or later after the taking of food, instead of almost immediately after, as in the case of gastric ulcer. It has been shown that there is a very great disproportion of duodenal ulcers in the two sexes, a ratio of eight in men to one in women, and they are more apt to occur in persons past forty than in those younger.

I am able to report to-night a case even younger than Dr. Musser's. The patient was operated on twelve days ago for duodenal ulcer. She was in a terrible fire eighteen months ago, receiving very extensive burns which resulted in marked duodenal ulceration, from which she almost bled to death a number of times. The patient is ten years younger than the one reported by Dr. Musser.

I think Dr. Martin was wise in not draining the lesser peritoneal cavity.

Dr. John H. Gibbon: I saw this patient of Dr. Taylor a few days after the first profuse hemorrhage in September. Dr. Musser had seen it in consultation with Dr. Branson and the question of operation at that time was considered. I did not operate then because the patient had had but a single profuse gastric hemorrhage, and I do not believe it is wise to operate under such conditions unless the hemorrhage is so alarming as to threaten life. The man had recovered from the hemorrhage, which took place several days previous. He had a good pulse and we did not think that he was bleeding. It has been shown that repeated small hemorrhages are really the dangerous ones. At a later period after repeated hemorrhages I would have operated, just as Dr. Taylor did. At the first consultation it seemed to me that the findings

indicated cirrhosis of the liver. Because of this I was opposed to operation.

Dr. Musser's case of the perforated gastric ulcer interested me especially, because I now have convalescing after perforation a case with a history similar to that of Dr. Musser's case. The intestinal symptoms, which had extended over a period of three years, were supposed to be of neurotic origin. The patient was, however, suddenly seized with severe abdominal pain. The abdomen was opened about four hours after the appearance of the first symptom. This is the sixth case of perforated gastric and duodenal ulcer I have had. The question of doing a gastroenterostomy at the time of the closure of the perforation is a very important one. The case which Dr. Musser and Dr. Keen reported before the College, of a lady over seventy with a perforated duodenal ulcer, in which the perforation was closed and gastroenterostomy performed, was quite remarkable. In none of my six cases did I feel justified in doing a gastroenterostomy. In one case I was obliged to do a gastroenterostomy eighteen months after the patient had recovered from the acute perforation. In the last case, operated on four to six weeks ago, the thought of doing gastroenterostomy occupied my mind for some time, because the ulcer was a very old one situated at the pylorus. There was so much induration that I had difficulty in inverting the edges of the ulcer. He did not take any food by the mouth for twenty-one days, but is now taking full diet without the slightest gastric symptom. In the case which relapsed after eighteen months I did a gastroenterostomy and the man is now well. Except in exceptional cases I do not believe it wise to do a gastroenterostomy at the time of the perforation. What the patient needs at that time is to have the perforation closed and the peritonitis arrested, and I believe it is a mistake to do an operation which requires much manipulation, and especially one which opens up the lesser peritoneum to possible infection.

Dr. J. Alison Scott: I think all practitioners of internal medicine are glad to hear the surgeons say that at times it is well to make your diagnosis before operation. In these cases of hemorrhage from the stomach it is a very puzzling question at times, whether any operation should be performed, until the exact source of the bleeding is ascertained. Within the past year we have had two or three cases in which, if our foresight had been as good as our hindsight, we would not have operated. If there is sudden and severe bleeding I think operative interference had better be postponed until we can at least make a tentative diagnosis.

Dr. William J. Taylor: I agree with Dr. Gibbon and Dr. Scott that in the presence of a single violent gastric hemorrhage it is a mistake to attempt operative interference. I was opposed to operation in this case until recurrence of the bleeding, which was exactly four weeks from the date of his primary hemorrhage, and then almost continuous hemorrhage from the bowel.

I think Dr. Rodman misunderstood me, for I did not advocate and would not advocate gastroenterostomy in cirrhosis of the liver. I do think, however that the question of a Talma operation is well worth considering, in view of the relief which this man had from this which was an accidental Talma operation. The vessels in the omental attachment were as large as match sticks and the relief to the circulation through these vessels was the means of relieving the œdema, and thus gave to the patient the full ten weeks of comfort which he had.

I have had but one case of perforation of a duodenal ulcer. This fortunately recovered after operation. I did not do a gastroenterostomy, as the peritoneum was much infected but simply drained an immense amount of fluid after closing the opening in the gut. I am confident that had gastroenterostomy been done with the peritoneum in a throughly infected condition there would have been a much greater risk. He recovered and has been very comfortable for years.

Dr. Musser: In speaking to Dr. Taylor's paper, I would say that both ulcers of the stomach and cirrhosis of the liver may occur conjointly, as Dr. Willard will remember in a case operated for me. The patient was an adult of late life who had all the symptoms of gastric ulcer. In the operation we were surprised to find that there was also cirrhosis of the liver. The case was reported to the Academy of Surgery by Dr. Willard.

EXHIBITION OF A CASE OF RESECTION OF THE KNEE.[1]

By G. G. DAVIS, M.D.

I DESIRE to show this case in order to put it upon record before the patient leaves the city. But a short time has elapsed since treatment, but sufficient progress has been made to make it worth while to present it in its present stage. The case is that of a young lady aged twenty-four years who had rheumatism three years ago in her shoulder, both hands, and left knee. The attack which was acute, became chronic, and kept her in bed for five months. The knee became stiff, and under chloroform she had it moved, but it became progressively stiff and finally resulted in bony anchylosis at an angle of thirty degrees. The skiagraph shows the condition of the bone. I reseeted the knee and removed a large piece of bone. The patella was glued fast to the front portion of the condyles of the femur. The piece removed is the lower condyle of the femur and upper portion of the tibia. The saw was first inserted between the under surface of the patella and the bone and sawn through; then the femur was sawn transversely, convexly above, and the tibia transversely, concavely below. A drain was inserted.

A sinus lasted for a short time. An apparatus is worn for bracing the knee. The removal of such a large piece of bone for securing motion is unusual. After the removal of bone a flap was taken from the outer side of the knee and turned in between the tibia below and the femur above and on the under surfaee of the patella. Then from the opposite side another flap was taken in laterally to cover the upper portion of the tibia. Healing followed practically without fever.

So far as I know, there has been no resection of the knee for immovable joint with this result. The knee had been anchylosed for three years. The quadriceps were not interfered with nor the tendon of the patella.

There has been other work done in this direction, but it is rare. Murphy and others did some work on the knee-joints; but in Murphy's eases there were only obtained ten degrees of motion; whereas this girl ean voluntarily flex and extend the knee, and when she sits down ean bring her knee at right angle to the thigh. As time passes the quadriceps will shorten and the joint will become firmer, and some lighter appliance will take the place of this somewhat eumbersome one.

[1] Read February 7, 1906.

CŒLIAC OR SPLANCHNIC (SLOCUM) PAROTITIS.[1]

WITH RECORDS OF THREE HITHERTO UNREPORTED CASES.

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In an able article which appeared in the *Annals of Surgery* for December, 1904, Dyball proposed the term cœliae parotitis for that very rare complication occurring subsequently to an abdominal or pelvic operation, namely, tumefaction with or without suppuration of the parotid gland. Professor Harris A. Sloeum, of the Philadelphia Polyclinic, has suggested that as the parotitis in these cases results not merely from surgical invasion of the peritoneal cavity but from splanchnic manipulation, or from some obscure interference with the visceral functions, a still more appropriate term would be "splanchnic parotitis." This suggestion is very *apropos* and one which we can heartily endorse.

From a study of the scanty literature of the subject we are forced to conclude that parotitis ranks with embolism and venous thrombosis among the very rarest of the operative sequels of abdominal and pelvic surgery. So rare is it, indeed, that Morley, of Michigan (*American Gynecology*, December, 1902), in 1902, could gather but fifty recorded cases of the complication from all surgical literature. Since then, so far as I know, but three additional cases have been noted, and these are reported in this paper for the first time.

As to the etiology of the condition we are as yet lost in a sea of uncertainty. The general belief among the surgeons to-day is that it is a manifestation of sepsis acting remotely from the

[1] Read February 7, 1906.

point of infection. This is probably erroneous. The neurotic or sympathetic theory, which presupposes an intimate though occult nervous connection between the parotid glands and the generative organs of both males and females, does not afford a satisfactory explanation for most of the cases that have been recorded.

This theory has numbered among its endorsers some eminent operators, including Stephen Paget in England, William Goodell in this country, and Bumm in Germany. The strongest argument advanced by these gentlemen in support of their theory has been the reversed process of ovaritis occurring consecutively to the true infectious mumps. This will not stand a close investigation, however; for if only the nervous relationship existed to explain the postoperative cases of parotitis, the query would naturally arise, Why should not an ovaritis or salpingitis in the female, or an orchitis in the male of traumatic or gonorrheal origin, be frequently associated with a sympathetic parotid bubo? As a matter of fact this association does not exist clinically, although hypothetically such a complication should be frequently noted.

That there is some peculiar sympathetic relationship existing between the cervical and facial glands and the abdominal and pelvic viscera cannot be controverted. The swelling of the thyroid gland during pregnancy and at the menstrual epochs is a well-recognized phenomenon. Contrariwise, the pronounced constringing influence of the thyroid and parotid-gland extracts upon the uterine mucosa and muscularis has won for these organic extracts a well-deserved place in uterine therapeutics, notably in the treatment of hemorrhagic endometritis, metrorrhagia, and uterine fibroids.

The most distressing symptom after every abdominal section is an insatiable thirst associated with stomatic dryness. This can be satisfactorily explained only by some reflex inhibitory action exerted upon the salivary glands by the abdominal incision and peritoneal and visceral exposure. The same scantiness of the salivary secretions has been noted in certain ovarian

cystomata and in other ovarian disorders, while the contrary condition of hypersecretion by the salivary glands occasionally constitutes an unpleasant accompaniment of gestation, and has also been noted by veterinarians in association with cervical glandular enlargement in bitches and other animals during the breeding time.

These are all verified facts, conclusively demonstrating the existence of some as yet unfathomed reciprocal influence exerted by these remote anatomic structures upon each other. They do not, however, afford a satisfactory explanation for the limiting of an inflammatory process of the parotid gland to a very minute proportion of abdominal and pelvic surgical lesions.

More satisfactory than the neurotic theory, although we must admit that it does not explain completely the intricacies of the condition, is the toxic theory. Dyball's conclusions appear to cover the matter as thoroughly as our limited knowledge of post-operative parotid involvement will permit. He states his belief about as follows:

Most probably cœliac parotitis results from the action upon the parotid glandular substance of peculiar toxic bodies which have been absorbed into the blood. These toxins may originate in one of three ways—

1. They may be secreted by certain organs which have been altered in their function by traumatism or by pathologic processes.

2. They may be toxins of microbic origin, as from the bacillus coli communis, which have been absorbed either from the alimentary canal, the peritoneal or uterine cavities, or the bladder.

3. They may be the products of a disturbed digestion.

This theory presupposes the presence, in any given surgical operative procedure upon the pelvic or abdominal organs, of certain pathologic bacteria in sufficient quantities or virulence to generate toxins, the action of which the devitalized tissues cannot successfully resist. This local pelvic or abdominal infection may be and probably is due not to defects in technic, but to the action of pre-existent germs, as the bacillus coli com-

munis, upon tissues the resisting powers of which have been reduced by the manipulation or traumatism necessary to the operative procedure. No postive conclusion as to the accuracy of this theory can be deduced until sufficient careful bacteriologic investigations have been made in a number of these interesting cases. As a working hypothesis, however, we may agree with Dyball that it may be accepted until some more worthy theory or positive information can be had.

Analogous to the foregoing theory, and it seems to me equally as plausible, is that recently presented to me by Dr. Francis A. Faught of this city. He suggests that, like the pancreas, the parotid gland, in addition to its function of supplying a digestive fluid, is probably associated with the processes of internal metabolism, either producing or destroying some as yet unknown substance present in the human economy. It is probable, therefore, that, as disturbance of the function of the pancreas gives rise to diabetes, a corresponding interference with some of the structures in the pelvis or abdomen may so alter reflexly the function of the parotid glands that they become a ready prey to the numerous micro-organisms existing in the mouth. This view is strengthened by the fact that recent investigations by Michaels in Paris, and Kirk, Faught and others in Philadelphia, have demonstrated that the function of the parotids may be profoundly altered in certain constitutional diseases, as gout and pyorrhœa alveolaris.

The one structure, or chain of structures, which may be influenced either directly or indirectly in operations within the pelvis are the pelvic lymphatics. These structures, even if they be not directly handled, are disturbed through stretching of contiguous structures or through pressure upon the nerves and blood-vessels in their vicinity. Faught believes, therefore, that one at least of the causes of cœliac parotitis is disturbance of the pelvic lymphatics, whereby some product of their activity which is essential to the health of the parotids is modified so that these glands fall easy victims to bacterial invasion from the mouth. The question is certainly one of unusual interest.

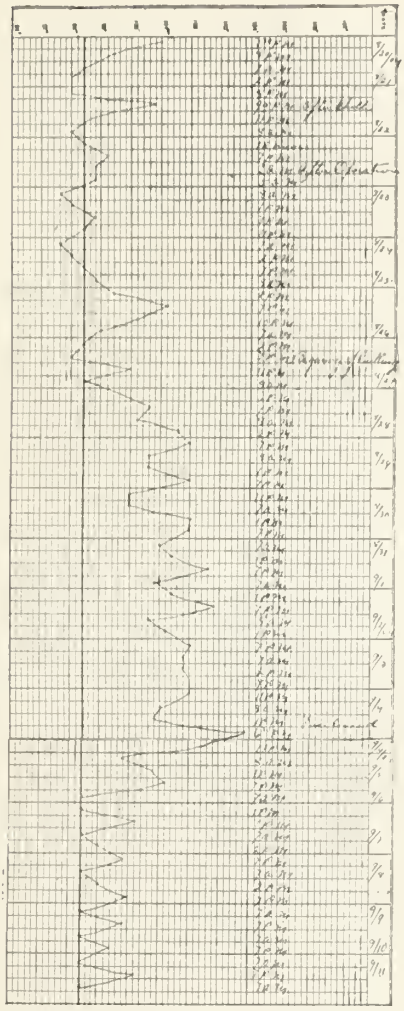
The case which occurred in my own practice is unique in that it is the only one recorded as occurring subsequently to an obstetric operation. In August, 1904, I saw in consultation with Dr. J. E. Roberts, of Lansdowne, Pa., a young primipara, Mrs. B., who, in the last weeks of her pregnancy was suffering from marked renal inadequacy. Her limbs and face, and the labia majora as well, were considerably swollen, and during the twenty-four hours previous to my visit she had almost total urinary suppression, but three and one-half ounces of urine having been removed by catheterization. At intervals the patient was flighty, and her temperature had risen to 101° F. Upon my advice a sterilized French bougie, No 17, was introduced. The following morning her temperature had fallen to 98° F., but she was quite drowsy. There were no labor pains during the day. The uremic symptoms persisted, and in the evening the patient had a chill, which lasted for twenty minutes, the temperature subsequently rising to 100.4° F.

This was followed by a profuse perspiration over the entire body, and a pronounced amelioration of the uremic symptoms. But two and a half ounces of urine were removed during the night. The following morning the drowsiness had returned. A scanty sanguineous vaginal discharge had appeared by this time, and there were also slight abdominal and sacral pains. The progress of the labor was slow and by evening the patient had grown decidedly worse. Her restlessness was extreme; she tossed about the bed and constantly moaned. Dilatation had advanced sufficiently to justify operative interference, and at 12.45 A. M., the patient was chloroformed, the membranes ruptured, and a foot extracted. During the delivery of the head a perineal rupture through the sphincter, but not into the bowel, resulted. The fetus, as is usual in these extreme cases of renal insufficiency, was stillborn. No fetal movement had been noticed for forty-eight hours, nor could the fetal heart-beat be detected. An immediate perineorrhaphy was performed.

The patient reacted well from the operation and did not suffer from nausea nor vomiting. Her pulse was normal, and although

she appeared to be greatly exhausted her condition was fairly good. A remarkable change in the urinary symptoms was noted almost immediately after the delivery of the child had been accomplished. An involuntary dribbling of urine began three hours after the operation and persisted throughout the day. In addition to this at 3 P. M. in the afternoon twenty-six ounces of urine were removed by the catheter; at 7.30 P. M., thirty-six ounces, and at midnight twenty-two ounces, or eighty-four ounces for the day. There was slight nausea with vomiting during the evening. Seventy-five ounces of urine were voided the following day, and from that time throughout the convalescence the action of the kidney was normal. The bowels had been freely opened by enema from the second day.

On the evening of the third day the patient complained of soreness in the right side of the face and neck, and examination showed a slight puffiness over the parotid region. This rapidly increased and by the afternoon of the fourth day was very pronounced. Dr. Roberts applied compresses of hot camphorated oil over the tumefaction, and subsequently, as the inflammatory symptoms increased in severity, an ointment of cocaine and ichthyol was applied. The temperature had risen during the inflammatory process, ranging from 100° to 102.4° F. This continued with slight variations for eight days, by which time beginning fluctuation could be detected over the swollen area. A small incision was made the evening of this day and four drachms of pus were removed. The wound was washed out and an antiseptic dressing was applied. The temperature immediately fell from 103.4° to 99.4° F., and in twenty-four hours reached the normal, from which it did not afterwards materially vary. The morning following the incision two drachms of pus escaped from the wound. A second incision was made at this time a little below, over the angle of the jaw, and one ounce of pus evacuated. The subsequent course of the case was uneventful, the patient making an absolute recovery. The perineal wound closed with perfect sphincteric action. The temperature chart is appended.



Temperature chart of parotitis following complete perineorrhaphy.

Through the courtesy of Dr. Brooke M. Anspach, of this city, I am enabled to present the history of the following case which occurred in his hands at the University Hospital.

Gynecologic Number, 1258, Mrs. E. B., admitted June 16, 1904; aged twenty-four years; suffering from a left tubo-ovarian abscess and a right pyosalpinx. A left salpingo-oöphorectomy

was performed, and a right salpingectomy. Three days after the operation a swelling of the left parotid gland occurred, which went on to suppuration and was opened in four or five days, about one drachm of thick pus being evacuated. The pus was persistently thick during the entire process and appeared to contain sloughs of the parotid-gland substance. There resulted a perforation of the external auditory canal which, however, did not involve the drum-head. About the time that the left gland suppurated the right parotid began to swell, but in a few days the inflammation subsided without suppuration. There did occur, however, some suppuration in the abdominal incision. The periparotid infiltration was very pronounced and the induration lasted for quite a long time. No bacteriologic examination of the case was made, but the pelvic trouble was undoubtedly of gonorrheal origin. The patient made a good recovery.

Dr. John A. McGlinn has very kindly contributed an additional case which occurred recently in the service of Professor William Easterly Ashton at the Medico-Chirurgical Hospital. The patient was a woman, fifty-seven years of age, who was admitted to the hospital with the diagnosis of subinvolution, endometritis, cystocele, and rectocele. The cervix was dilated, the uterine cavity curetted, and an anterior colporrhaphy and an Emmet's perineorrhaphy performed. Two days after the operation an attack of dysentery supervened from which she quickly rallied. Eight days after the operations a bilateral parotitis developed. The glands eventually suppurated and were opened and free drainage established. The patient made an uneventful recovery. Drs. Ashton and McGlinn were unable to trace any source of contagion.

Comments and Statistics. An interesting fact to be noted in the histories of the fifty-four recorded cases is that a certain number of the parotid tumors contained pus. Of the fifty-four cases recorded thus far, twenty-three, or 42.5 per cent., suppurated. As Dyball has indicated, the suppuration does not appear to be an essential feature of the condition, but results in all probability from a loss of resisting power in the gland, which when inflamed by

the action of the toxins forms a *locus minoris resistentiæ*, and becomes secondarily infected by pyogenic organisms, probably staphylococci, which are introduced by the blood-stream or more probably through Stenson's duct. In the non-suppurative cases either the function of the gland has been but slightly impaired or the pyogenic organisms have failed to gain entrance into the inflamed tissue. The condition is by no means to be regarded as septicemic or pyemic in nature, and, as Paget has remarked, many of the non-suppurative cases are afebrile in their course.

As regards statistics the condition is one of marked infrequency. Paget collected one hundred and one cases of what he termed "sympathetic" inflammation of the parotid gland, fifty of which resulted from injuries, diseases, or temporary derangement of the genital organs, as from slight blows or the introduction of a pessary. Among the fifty-four cases gathered by Paget, Morley, and myself there were thirteen deaths, or a mortality of 24 per cent. Morley calls attention to the fact that nine of the thirteen fatal cases showed suppuration. In eighteen cases both parotid glands were involved; in sixteen cases the right gland and in thirteen cases the left became inflamed; in seven of the patients the inflamed side is not designated. Seven of the patients were males and forty-seven females. The average day of development of the parotid swelling was the fourth or fifth after the operative procedure. Twenty-two of the cases occurred subsequently to ovariotomy; five followed the removal of ovarian tumors; six occurred after hysterectomy; three after a gastrotomy; six after abdominal section (object not designated); two after salpingo-ovariectomy; two after appendectomy; and one each after enterostomy, herniotomy, excision of the omentum, intestinal obstruction, excision of a gastric ulcer, suppurative peritonitis, anterior colporrhaphy, and complete perineorrhaphy.

DISCUSSION.

Dr. J. Chalmers Da Costa: It seems that in considering this condition we are in the same state of confusion as has been the rule in the past when taking up a new subject. There must be several, or perhaps many, different lesions which we mass under the general term of parotitis from abdominal operations. The simplest possible explanation of parotitis may be the real one in most instances. These cases are frequently, or perhaps always, associated with a certain dryness, foulness, and swelling of the mucous membrane of the mouth. We may, therefore, consider the condition to be simply an ascending inflammation from the mucous membrane of the mouth. When we recall that the parotid gland contains lymphatic glands we know that we may have in some of the cases ordinary lymphangitis, and these glands as in any other part of the body may undergo suppuration.

I have had three cases of supposed parotitis following operation. One followed an abdominal operation and was accompanied by foulness of the mouth; one followed an operation for carcinoma of the lip, and in this of course the question of the influence of an abdominal operation did not enter at all. In a third case, examination showed the swelling to be in front of the parotid and not within it. An abscess formed and the abscess was due to blocking of the duct and secondary infection.

Dr. David Riesman: When we consider the foul condition of the mouth so often found in hospital patients, it is quite surprising that inflammation of the salivary glands is not more common than it is, especially if the theory of ascending inflammation, that is, inflammation extending along the excretory duct, is the correct one. It is quite probable, indeed it has been demonstrated by Biedl and Krauss, that the salivary glands excrete bacteria circulating in the blood. In the majority of infectious diseases, such as typhoid fever, in many cases of pneumonia, and in septic conditions, there is a bacteremia. For reasons that are more or less obscure the bacteria in these cases might find lodgment while in transit through the glands and set up an inflammation. In typhoidal parotitis the bacillus of typhoid fever has more than once been found. Perhaps the most interesting feature in connection with this subject is the significance of parotid bubo in diagnosis. In the absence of pneumonia, the parotitis is usually associated with inflammatory processes below the diaphragm, and thus will focus the attention upon the abdomen. It has led, as in a case reported from the Johns Hopkins Hospital, by Dr. Thayer, I think, to a correct diagnosis in an unsuspected case of typhoid fever. Several years ago there was in one of my wards in the Philadelphia Hospital an old man with pyuria, the urine being strongly acid. We did not know definitely whether he had pyelitis or not, but on the strength of a parotitis that developed a diagnosis of pyelitis

was made, and it was verified at autopsy. The case has been reported in the *Philadelphia Hospital Reports.*

I have seen parotitis during pneumonia; the gland, which seemed to contain pus, was incised but no pus was found. In typhoid fever I have observed several cases of it, in all of which the inflammation subsided without any suppuration ensuing. The last case of parotitis to come under my observation I saw through the kindness of Dr. John B. Deaver. The patient, a woman, was suffering from gastric ulcer, and had had a number of hemorrhages. When I saw her she had an enormous swelling of the right cheek, starting in the parotic region, with a great deal of edema extending to the lower eyelid. Suppuration had taken place, and a moderate amount of pus had been evacuated after incision.

In addition to the affections I have mentioned—typhoid fever, pneumonia, pyelitis, gastric ulcer—parotid bubo has been seen in connection with appendicitis, disease of the pelvic organs, operations and injuries upon the testicles, etc.

The old idea of a sympathetic inflammation has of course to be abandoned, and in its stead we have to accept two other possibilities: that of inflammation ascending along the salivary ducts, and that of metastasis, a hematogenic infection.

As to the terminology, perhaps the best name is secondary parotitis, contradistinction to primary parotitis or mumps.

Dr. Dorland closes: I wish to thank the gentlemen who have discussed my paper so ably. I recognize that the condition in the gland is an ascending inflammation, but why the gland should become involved at one time, as after an operation, and not at another is a question difficult to answer, and it is this which prevents our coming to a satisfactory conclusion. As Dr. Da Costa states there are several varieties of parotitis. My paper deals with but with one form, namely, that occurring after abdominal or pelvic operation. Therefore, splanchnic parotitis is but one form of the "secondary" parotitis of Dr. Riesman. The subject is one of which we know but little, and this fact is proven by the scantiness of the literature.

THE ANATOMICAL BASIS FOR THE TREATMENT OF SCOLIOSIS BY EXERCISE.[1]

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If an infant be placed upon its back it will lie with straight spine and thighs flexed to nearly ninety degrees; if he be placed in a sitting position the thighs remain flexed and the spine shows a single convex backward curve, involving its entire length.

With the assumption of the standing posture begins the struggle to develop the extensors that lasts through life. This angle of flexion between the trunk and thighs must disappear, and this is effected by a compromise between the spine and the hip joint, both yielding part way.

The hip is extended and the ilio-psoas put upon the streteh, but not sufficiently to preserve the original straight spine, for a sharp eurve forward in the lumbar region develops; the anterior vertebral ligaments are stretehed; the disks become thiekened anteriorly and the erector spinæ muscle becomes active and powerful. This eurve, very marked in young children and giving them their charaeteristic "pot-bellied" appearance, is followed by a compensating dorsal curve in the opposite direction, and by a third in the eervical, with a forward convexity like the lumbar.

These three eurves are physiological and are always found in the normal adult spine.

During the establishment of these curves deviations may oeeur from various causes, acting upon the plastic strueture of the spine and its supports. The most common deformity is the

[1] Read February 7, 1906.

total C-shaped lateral curve, with lowering and backward twisting of the right shoulder and projection of the right hip. One part of this curve tends to become fixed, and at once a compensating curve begins to develop above or below in the opposite direction. This may even be followed by a third, and these pathological curves are always accompanied by rotation or twisting, and tend to become fixed and permanent. The integrity of the physiological curves is protected against the onset of deformity by three lines of defence of increasing strength:

1. The muscles, forming an advanced mobile series of outposts that can be brought into service, often in relays, powerfully, if intermittently.

2. The ligaments, more resistant but less mobile, requiring more long-continued and persistent attacks to overcome their normal protective action.

3. The bones, which are the citadel and which yield to the influence of deformity only after the other two lines of defence have long since been carried. When they have adapted themselves to the deformity and become changed in shape, all treatment must be more or less cosmetic in character, for the concealment of the deformity rather than its correction.

The muscles that may be used to act upon the spinal column fall habitually into three groups:

1. Anterovertebral, consisting of the psoas in the lumbar region, the three scaleni, the longus colli, and the sternomastoid in the cervical.

2. Spinoscapular and humeral in two layers, the trapezius and latissimus dorsi superficially, and the rhomboids and levator anguli scapulæ beneath them.

3. Spinal, consisting of the two posterior serati, superior and inferior; the erector spinæ mass, thick and fleshy in the lumbar and cervical regions, but thin and tendinous in the dorsal. Some of the smaller slips, well developed in the cervical and lumbar regions, illustrate the principle of regression, being represented only by ligamentous bands in the dorsal. This is significant of the amount of movement in different regions.

Movements of the spine are *flexion, extension, side bending,* and *rotation.*

Flexion takes place mostly at the lumbar and cervical regions, the dorsal backward convex curvature being accented but slightly.

Extension is almost entirely at the lumbar and cervical regions. Even in contortionists, when the head is bent back on the hips, the dorsal region remains comparatively fixed.

In *side bending,* the spine having been first flexed, the lumbar region is locked and the movement takes place in the dorsal region. It is accompanied by rotation of the bodies to the *convexity* of the lateral curve (Lovett).

Side bending from the erect position takes place in the lumbar and lower dorsal, and is accompanied by rotation of the bodies to the concave side of the lateral curve.

Side bending from position of extreme extension takes place in the lumbar region almost entirely, the dorsal vertebræ being locked. Rotation of bodies is to the concave side of the lateral curve.

Rotation in the erect position is greatest in the cervical region, gradually disappearing through the dorsal. It is practically absent in the lumbar region except under traction.

The most freely movable regions are naturally most abundantly provided with muscles, and it will be to the analysis of their action and to the application of this action, singly or in groups, that treatment will be directed.

In the Lumbar Region. The psoas takes its origin from the bodies of all the lumbar and the twelfth dorsal vertebra, running down and out to the small trochanter. The femur can be used as a lever to pull by means of the psoas on the bodies of the vertebræ (Fig. 1). As rotation takes place about the articular facets, which are behind the origins of the psoas, the right psoas would pull the bodies over to the right and would tend to unwind a rotation to the left.

The isolation of the right psoas muscle is then the problem. If we flex one or both thighs the abdominal muscles do most of the work, but if the right only be flexed and the left heel pressed

backward against the table, the patient being recumbent, a fair amount of isolation can be secured with a little practice.

The erector spinæ is put in action almost equally on both sides, but the abdominal muscles can be completely relaxed during the entire movement.

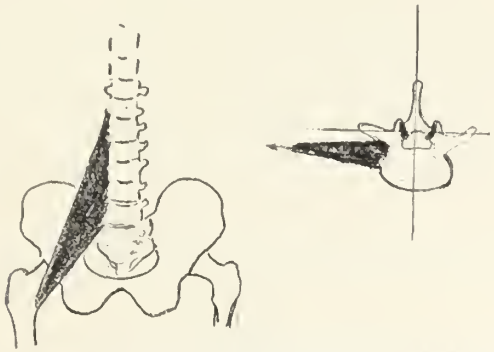

FIG. 1.—The direction of the pull on the lumbar vertebræ caused by the contraction of the psoas muscle.

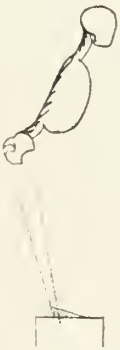

FIG. 2.—Action of the erector spinæ in bending and rising, a movement often fallaciously given to develop the abdominal muscles.

The erector spinæ mass, including the multifidus and other short deep slips, is most complicated in its distribution, this complexity being useful in that its divisions may be employed in relays, the tired strands being replaced by fresh parts and the onset of fatigue greatly postponed.

As a mass it takes origin from the posterior aspect of the sacrum,

the iliac crest and the lumbar spines, and transverse processes (Fig. 2). It is very thick and fleshy in the lumbar region, where it separates into the two main divisions, the outer, tendinous, going to the six lower ribs just outside their angles, and prolonged upward by the accessorius and cervicalis ascendens; the inner, more fleshy, going to rib and transverse process throughout the entire dorsal region, and with a fleshy bundle going from spinous process to spinous process from the second lumbar to the first dorsal. The deeper layers fill the hollow between the transverse and spinous process, the general direction being upward and inward, while in the lumbar region muscular slips go between adjacent trans-

Fig. 3.—Action of the left erector spinæ mass during support on the right foot, as in walking.

verse processes as well as between the spines. The general action of this mass, and it is impossible to contract separate portions of it at all, is to make a curve with a concavity on the active side, pulling down the ribs on that side and increasing lordosis. The quadratus lumborum is a depressor of the last rib, and would act with the erector spinæ of the same side. The lumbar and lower dorsal portions of the erector spinæ are isolated alternately in the ordinary act of walking, as can be readily proven by placing the hand over them and feeling their alternate contraction; the supporting of the weight on the right leg will strongly contract the muscle on the left side (Fig. 3).

The supporting of the weight on the right arm and feet, as in the diagram (Fig. 4), brings in the right erector spinæ strongly throughout the dorsal region; but if the support be at the hips (Fig. 5) the action is reversed, except that in Fig. 4 the active contraction crosses at the cervical region to the left.

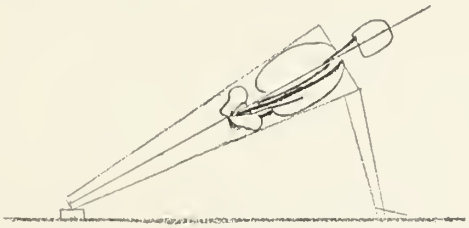

FIG. 4.—The right lumbar and dorsal and the left cervical portions of the erector spinæ are put in action when support of the body is at shoulder and foot.

FIG. 5.—The left lumbar and dorsal and the cervical portions of the erector spinæ are put in action when support is at the hips only.

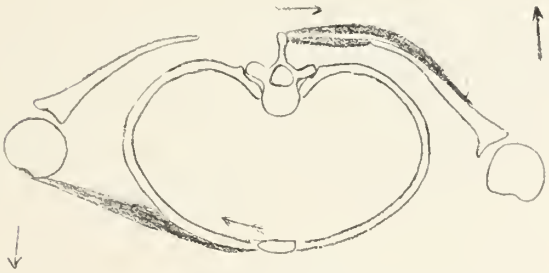

FIG. 6.—Torsion of the dorsal spine and thorax by the action of the right pectorals and left spinoscapular and humeral muscles.

In the dorsal region the muscles are much thinner and more tendinous, and the left intertransversales and interspinales show regression into ligamentous bands.

The dorsal spine is much less affected by muscular action than either the lumbar or cervical, but ribs can be employed as

levers, and the thoracic cage, with its muscular attachments, can be made an active means of correcting a deviation.

In movements where the humerus is fixed and the spinoscapular muscles contracted, the spinous processes are pulled over to the active side by the trapezius, the latissimus dorsi, and the rhomboids.

If in addition the pectorals of the opposite side be contracted a strong torsion is exerted on the dorsal spine (Fig. 6). Another influence on the dorsal region can be exercised through the action of the respiratory muscles, the upper ribs being fixed by the scaleni, serratus posticus superior, sternomastoid and others. The collapsed side may be enlarged and the curvature lessened by fixing the side of the thorax toward the convexity and confining forced respiration as much as possible to the deficient side.

In the cervical region the erector spinæ is re-enforced by the splenius capitis and colli, the complexus, and by the reappearance of the intertransversales and interspinales, besides the oblique and recti, of the suboccipital triangle, all forming a thick muscular mass. Movement here is very free in all directions, most notably rotation, which takes place largely at the first two cervical joints through the action of the inferior obliques, as well as the more superficial muscles.

While this is not the occasion to describe more than the mechanical principles at work in the employment of exercise, it is well to bear in mind that it is only in active alternate contraction and relaxation that an effect can be obtained, and continuous tension quickly tires and lowers the tone of all muscular tissue.

DISCUSSION.

Dr. De Forest Willard: I am glad that Dr. McKenzie has applied his accurate anatomical knowledge and his practical experience in muscular exercise to the relief of this deformity. His carefully laborated scheme, pointing out the special muscle or set of muscles which by their action upon the ribs and upon the spine assist in straightening the rotation, is most valuable. Muscles are such powerful agents both in the production and in the correction of deformities that it is to these forces we must look for our greatest aid. I am sure that the mechanical principles which he has illustrated will be of service to all of us.

Dr. James K. Young: I was particularly interested in Dr. McKenzie's remarks concerning the isolation of muscles. If we could isolate the muscles at fault and develop them by exercises we cure all cases in their early stages. A difficulty in this country is that cases are not treated daily nor sufficiently long. In this country perhaps twenty or thirty minutes are given daily or every other day. In Germany three or four hours daily are given to the treatments, and in addition the patients devote themselves to the treatments and recover.

The speaker did not give sufficient importance to the intrinsic muscles which the Swedes group together under the comprehensive title of the *muscle spiral*. The development of this group in some instances is very important and can only be accomplished by rotary movements. By employing these rotary movements in selected cases I have quickly and permanently cured cases which otherwise would have been incurable.

Dr. J. Madison Taylor: I wish to express my admiration of Dr. McKenzie's presentation of this important subject and the remarkably artistic quality of the illustrations. One point of practical value which occurs to me is that the treatment of many conditions of the back where we have painful spots, infiltrations, stiffness, etc., exercises directed to those muscles of the back for elasticizing purposes, seem not only to correct latent deformities, but produce other beneficial effects. I think we ought to appreciate more the significance of elasticity in the muscles in young and old as an index of health. Not only so, but these erector spinæ muscles are affected immediately during derangements of the viscera and in inflammatory states of nerves.

In subacute disorders they constitute a pronounced factor and when suitably elasticized contribute largely toward restoration of vasotonus, hence recovery of general force.

Dr. McKenzie: I can only add that the isolation of muscular action is a matter of practice. In a simple movement done for the first time large groups are put in contraction that have a very indirect influence on the action for which we are trying. It is only by repetition, care, and attention that we can eliminate the unnecessary groups and concentrate the action on the muscles required.

IS NEURALGIA A FUNCTIONAL DISEASE? A STUDY BASED UPON THE PATHOLOGICAL FINDINGS OF EIGHT CASES.[1]

By ALFRED GORDON, M.D.

As is well known, a painful affection of a nerve may be due not only to an evident injury or to a direct inflammation of a nerve caused by pressure, tumor, hemorrhage, toxic condition, etc., otherwise speaking to *neuritis*, but also to a morbid condition in which none of the mentioned causative factors are present; we then speak of *neuralgia*. While the first term gives a clear idea of the morbid process, the latter implies only a subjective symptom.

In both conditions the element, pain, is present and there is no possibility in making a practical distinction of the two forms of nerve pain. On the other hand, in a number of cases described as neuralgia, the pain was found to be the result of neuritis.

A sharp distinction between neuralgia and neuritis cannot be established. Even in recent cases of ordinary neuralgia there are great presumptions in favor of a material basis. Surgery has contributed considerably to the elucidation of the pathogenesis of neuralgia. Microscopic examinations of excised peripheral nerves and Gasserian ganglia have shown that in a number of cases degenerative changes were present. More or less intense alterations of a chronic inflammatory character have been found in the ganglion, as well as in the peripheral branches. The point of contention lies in the difficulty of explaining where the primary

[1] Read March 7, 1906.

inflammatory process is and which of the two is involved secondarily. Krause (*Die Neuralgie des Trigeminus*, 1896) believed that the changes in the Gasserian ganglion in some cases were secondary and in some primary. That an inflammation may begin in a peripheral nerve and assume an ascending character is a possibility. Kowalevsky (*Monat. f. Psych. u. Neur.*, vol. ii, p. 147, abstract) has shown that after cutting a sciatic nerve in an animal and injecting a few drops of a 5 per cent. chromic acid solution into the central end, changes in the cells of spinal ganglia were found at the end of four days.

Besides a peripheral and ganglionic, so to speak, origin of pain in neuralgia there may be also a central. That this is true can be seen from the history of those cases in which pain is felt in another region than that of the nerve irritated: the irradiation of the pain to neighboring nerve-areas is undoubtedly a central phenomenon.

In the pathological studies of trifacial neuralgia some observers called attention to a third element as a possible cause of pain. Dana particularly (*Medical News*, 1891) speaks of the great role played by the condition of the bloodvessels of the peripheral nerves. According to him an arteritis is the chief cause of the neuralgia. Thoma (*Deut. Arch. f. klin. Med.*, vol. xliii, 188) and Rose (*Trans. of Med. Soc. of London*, vol. xv, 1892) corroborated to a large extent Dana's views.

Sifting all the recorded data concerning the pathogenesis of trifacial neuralgia one must say that, while some authors place the initial lesion in the peripheral nerves, others place it in the Gasserian ganglion, and still others in the bloodvessels of the nerves. The views of the majority of them are extreme. Keen and Spiller (*American Journal of the Medical Sciences*, November, 1898) are very conservative. Their careful studies of the Gasserian ganglia in eleven cases of tic douloureux led them to believe that no absolute view in favor of one or of the other possibility can be adopted, but they are inclined to believe that the primary condition is *probably* a neuritis.

The object of the present report is to put on record the patho-

logical findings of eight cases of trificial neuralgia, in which only the peripheral branches were removed. While the Gasserian ganglia were not operated upon, and it is therefore impossible to draw positive conclusions as to relative involvement of both parts of the fifth nerve, it nevertheless shows the frequency of an *organic* origin of the so-called *idiopathic* neuralgia.

Case I.—Female, aged sixty-five years. Neuralgia for four years in the inferior dental nerve. Operation was performed in 1902. The nerve appeared larger and thicker than normally; it was also congested. Transverse and longitudinal sections were stained by Marchi and Weigert methods. The degeneration was marked in some sections at the periphery of the nerve bundles, in some in the centre. Some bundles were found to be completely degenerated, some only partly. Endarteritis was very much pronounced in the bloodvessels of the epineurium: the intima of some vessels was so thickened that it closed up almost entirely the lumen of the vessels. Where the endarteritis was marked, the nervi nervorum were totally degenerated. Degeneration of the latter was found in all sections. Staining with ammonium shows that a great many axis-cylinders have totally disappeared.

Case II.—The same patient was operated two years later for neuralgia of the auriculo-temporal branch, which existed only about five weeks. The bloodvessels presented marked changes; intima thickened, torn; lumen almost entirely occluded. Adventitia was also thickened. The nerve-bundles only in the vicinity of the altered bloodvessels show distinct degeneration.

Case III.—Female, aged fifty-four years. Neuralgia of the superior maxillary nerve of seven years' duration. Operation in 1903. Here only the nervi nervorum showed marked degeneration, while the main nerve-bundles appear to be intact. The bloodvessel changes are considerable. The intima is irregularly and markedly thickened, the elastica is torn in many places. The adventitia is also thick. The lumen is narrowed. The vasa vasorum are only to some extent involved.

Case IV.—Male, aged fifty-eight years. Neuralgia of the inferior dental branch of two years' duration. Operation in 1904. The bloodvessels show very marked changes: the inner membrane is much thickened, the lumen is narrowed. The epineurium is also thickened. As to the nerve fibres, only those at the periphery show degeneration. With Marchi method no recent degeneration could be seen.

Case V.—Female, aged forty-three years. Neuralgia of inferior dental branch of three years' duration. Operation in 1905. Only a few bloodvessels show thickening of their walls. In the immediate vicinity of these vessels some small nerve-bundles are degenerated. In some places the epineurium is thickened and there the nervi nervorum are degenerated.

Case VI.—Male, aged thirty-four years. Neuralgia of the superior maxillary branch of three months' duration. Very few bloodvessels show thickening of their walls, and these changes affect only one side of the vessel. On the same side in the immediate vicinity of those bloodvessels some very small degenerated nerve-bundles are found.

Case VII.—Female, aged thirty-six years. Operated in 1900 for neuralgia of the infraorbital nerve of seven years' duration. At the beginning of 1904 the supraorbital nerve was excised. The inferior dental nerve became painful in the middle of the same year. Six months later the latter nerve was excised. Its microscopic examination shows degenerative changes of the nervi nervorum and some thickening of the walls of the neighboring bloodvessels. The majority of the bloodvessels were normal.

Case VIII.—Male, aged twenty-nine years. Neuralgia of the supraorbital nerve of five months' duration. Nerve removed in 1904. A great many sections were examined and in all of them only some of the nervi nervorum showed degenerated fibres, and similarly to the last two cases they were situated in the vicinity of small bloodvessels which presented some thickening of their walls.

Resume of the Pathological Findings of Eight Cases. In the first four cases, viz., in patients of sixty-five, fifty-four, and fifty-eight years of age, respectively, the bloodvessels are uniformly thickened and present a very narrow lumen; these changes are marked and found in every bloodvessel of numerous sections. In the last four cases, viz., in patients of forty-three, thirty-four, thirty-six, and twenty-nine years of age, respectively, only a few bloodvessels showed some thickening of their walls. The minimum of vascular alteration was seen in Case VI, in which an operation was performed three months after the onset of the neuralgia. As to the nerve-bundles themselves, those situated in the immediate vicinity of the altered bloodvessels always showed distinct degeneration. The degree of alteration of the bloodvessels *generally speaking* is in proportion with the degree of nerve degeneration and with the number of degenerated nerve-bundles. Exception is found in Cases II, III, and IV, in which in spite of the generalized marked arteritis only the nervi nervorum or a few peripheral small nerve-bundles were involved.

The duration of the disease has no special bearing upon the degree of involvement of the nerves, as it can be seen from the

following: Case I, four years' duration, degeneration marked; Case II, six weeks' duration, degeneration slight; Case III, seven years' duration, degeneration slight; Case IV, two years' duration, degeneration slight; Case V, three years' duration, degeneration slight; Case VI, three months' duration, degeneration slight; Case VII, six months' duration, degeneration slight; Case VIII, five months' duration, degeneration slight.

In the light of these findings can we draw any inference as to the pathogenesis of neuralgia?

First of all, in each of the eight cases there was a peripheral nerve degeneration; in some of them the nerve-bundles themselves are more or less involved, in some only the nervi nervorum were affected.

Is this nerve degeneration a primary affection or secondary to an involvement of the Gasserian ganglia? The latter were not removed from my patients. It is therefore impossible for me to ascertain their condition. Judging from the researches of others, and particularly of Keen and Spiller, it is presumed that at least in neuralgias of long standing, as in Cases I, III, and V, of my series, the Gasserian ganglia are affected. On the other hand we cannot assume the position that in every case the Gasserian ganglion is primarily affected and the peripheral nerve involvement will necessarily follow. Against this view speak Cases III and V, in which the neuralgia existed seven and three years, respectively, and still the peripheral nerve changes were about as moderate as in the other cases in which the neuralgia had been of only several months' standing. The history of Case II is very significant from the latter standpoint. The patient suffered for four years from a neuralgia of the inferior dental nerve. The nerve being removed showed a very pronounced state of degeneration. About two years later pain appeared in the area of distribution of the auriculo-temporal nerve. Five weeks later this nerve was removed and showed some degeneration only in the vicinity of those bloodvessels which show thickening of their walls. Assuming that the Gasserian ganglion is the original cause of the

excruciating pain, the pain in auriculo-temporal branch would have existed long ago. Here the pain lasted only five weeks and a degenerative peripheral condition was found. The objection may be made that the reason of a late involvement of the auriculo-temporal nerve was due to a late involvement of the cells of the Gasserian ganglia corresponding to this nerve. It is not likely that the lesion of the group of cells corresponding to the inferior dental nerve, lasting four years, would not spread to other neighboring cells during that period of time and give rise to neuralgia of other branches emanating from the same ganglionic body. As the patient was free from pain during two years, I am justified to presume that the pain which appeared in the auriculo-temporal nerve and lasted five weeks was due to a primary degenerative state of the nerve itself.

There is another factor which must be taken into consideration in discussing the pathogenesis of neuralgia, viz., the state of the bloodvessels. Referring to my cases I see that changes were found in the bloodvessels of each of them. Arteriosclerotic changes were seen in the patients of advanced age, but thickening of the adventitia was found even in the man of twenty-nine. While the degree of vascular change is not at all parallel to the degree of nerve degeneration, nevertheless it was inevitably in the immediate vicinity of the altered wall of the bloodvessel. In Case II, for example, in which the patient of sixty-five presented a marked arteriosclerosis, the fibres of the auriculo-temporal branch were only slightly degenerated and not near each vessel. Consequently one can draw this conclusion, that while the condition of the bloodvessel has a certain effect upon the neighboring nerve fibres, nevertheless their mutual relations cannot as yet be considered as the unique cause and effect.

From a critical study of my cases, also of those of other investigators, the following conclusions, I believe, can be drawn.

1. The occurrence of degeneration of the peripheral nerves is *frequent*, if not constant, in neuralgia.

2. That this nerve degeneration is very probably a primary condition, which as a neuritis assumes an ascending course and

involves secondarily the Gasserian ganglion. Although this contention is still debatable, there is great probability in favor of the above view.

3. The bloodvessels undoubtedly play a certain role in the causation of a degenerative state of the peripheral nerve.

4. That it is difficult, if not impossible, to draw a sharp distinction between neuritis and neuralgia, as accumulated facts show an *anatomical* basis in the latter affection.

5. In view of these anatomical facts it is highly important to remove surgically a nerve affected with so-called *neuralgia* as early as possible after a short trial of medical treatment is given.

The specimens were supplied to me for pathological examination by Drs. Roe and Eckle, to whom I acknowledge my indebtedness.

DISCUSSION.

Dr. Charles K. Mills: Tic douloureux I believe is primarily a disease of the Gasserian ganglion. There are pathological, clinical, and surgical reasons which to a certain extent uphold this view. The manner in which the disease originates and extends, the fact that it passes from one nerve branch to another, the fact that relief is frequently not afforded by several peripheral operations, and is by a central operation, argue in favor of the primary Gasserian origin of the disease. The disease is one of instability and degeneration rather than a true inflammation. I do not believe that the degeneration of the nerves found in these cases is of the same character as that which is present in a true neuritis, which has for its signs tenderness on pressure and other well-known symptoms. However, there is much to be said, and Dr. Gordon has well said it, in favor of the probable peripheral origin of the disease in some cases.

Dr. Gordon (closes): In answer to Dr. Mills concerning the origin of the neuralgic pain, I would say that in the first case of my series (a woman aged sixty-five) there had been neuralgia of the inferior dental nerve for a number of years. Relief of pain followed removal of the nerve, but it reappeared in the auriculo-temporal branches. Five weeks later the latter were removed and pathological changes were found. It would be desirable to know the origin of the pain, but the cases which I have examined prove to me that peripheral nerve degeneration is always present. It is desirable and urgent to remove as promptly as possible a neuralgic peripheral nerve, after a short trial of internal treatment has been given.

EXHIBITION OF A PATIENT IN WHOM GASTRO-ENTEROSTOMY FAILED TO RELIEVE HEMATEMESIS AND OTHER SYMPTOMS IN CONNECTION WITH DUODENAL ULCERATION.[1]

By WILLIAM L. RODMAN, M.D.

I FELT that it might not prove uninteresting to review briefly the subject under discussion at the last meeting of the College by presentation of a case of unusual interest both medically and surgically.

A young woman now in her twenty-first year met with severe burns when she was past eighteen. She was in the holocaust at Chicago when the Iriquois theatre was destroyed on the 30th of December, 1903. Up to that time she had had perfect health, except that she had never menstruated regularly. When the discharge appeared it was irregular and very small in quantity. As the result of these injuries she was laid up for about five months. The burns of the arm and shoulder were superficial and healed quickly. Those of the lower extremity healed slowly. Five months afterward the latter wound was curetted and she subsequently made a quick and satisfactory recovery. During the summer of 1904 she began to complain of nausea and burning in her stomach, but no decided pain and no vomiting. The following September she complained of considerable pain, reaching its maximum an hour and a half to two hours after eating. This would be followed by vomiting, which always gave her relief. Usually there was flatulence. These symptoms continued during the winter of 1904 and 1905. In May, 1905, there appeared in the right side a lump situated midway between the costal arch and the crest of the ileum. Laparotomy was done and the surgeon reported that three pints of fluid were removed. The nature of the fluid he did not specify but called it an hepatic abscess. The surprising statement is made that the appendix was removed through this incision, which was high up.

[1] Read March 7, 1906.

While one can understand that an appendix might be removed through so high an incision, still one would not choose that site for an appendectomy. She improved rapidly after the operation and remained pretty well until the middle of August. On the 17th of August she fell down stairs striking her abdomen in the location of the cicatrix. There was immediate pain and vomiting of blood—more than a quart in an hour and an equal amount passed per rectum; in a short time she was in a profound shock. She was taken into the hospital at Wilkes-Barre and four hours afterwards laparotomy was done. The nature of the lesion was not fully ascertained and the abdomen was closed without more radical procedure. From that time until January she has vomited blood in small quantities every few days. On the 13th of January after exercising in a gymnasium she strained and vomited blood, and was brought into the accident service of the Medico-Chirurgical Hospital. There were repeated hematemeses, and on one occasion she vomited more than a quart. I was asked to see her by Prof. Ashton and was convinced that she had ulceration of the duodenum. Gastroenterostomy was done on January 21st. Four hours afterward she began to spit blood and later vomited blood in small quantities. At half past ten I was summoned and found that she had been vomiting very freely and that she had lost more than a quart of blood. Between 10.30 P.M. and 2 A.M. she had vomited almost a gallon of blood and she was completely exsanguinated and pulseless. We feared to put anything into her stomach and used adrenalin by hypodermoclysis and ice locally to epigastrium. When the vomiting finally became so severe we introduced a stomach tube and put in hot water at a temperature of 125°. Something had to be done as she was almost gone. We gave her in this way a pint and a half of hot water with 10 grs. of tannic acid. She did not bleed further until the following morning at half past six, and then only two or three ounces of blood which had been lying in the stomach for some hours. There was no fresh hemorrhage and she made a satisfactory but slow recovery up to a certain point. There was no vicious circle and she was up and around the hospital before the end of the third week. She has not done well in the last two weeks. She frequently now has pain and occasionally her temperature without assignable cause will go up to 101 or 102° and sometimes higher. There is evidently considerable perigastritis, and whether this indicates an attempt of nature to protect the parts against possible perforation is a matter of surmise. The question arises whether she had an appendiceal abscess at the time of the first operation, or a subphrenic abscess which was caused by a perforation of either a duodenal or gastric ulcer. It would seem to me in view of the symptoms which she has had that the latter view is the more tenable one. It is also questionable whether I did not make a mistake in not doing a pyloroctomy instead of a posterior gastroenterostomy. I think that pyloroctomy may yet have to be done.

This case shows that gastroenterostomy, while a most valuable operation, is at best in many instances a makeshift and falls short of meeting pathological indications. It often fails to cure hemorrhage; this case proves it. It has also failed, not infrequently, to prevent perforation and subsequent cancerous degeneration of a benign ulcer. With these shortcomings in mind, I suggested excision of the ulcer-bearing area—pyloroctomy—in lieu of gastroenterostomy in properly selected cases.

PLASTIC RESECTION OF THE MAMMARY GLANDS FOR BENIGN GROWTH.[1]

By WILLIAM L. RODMAN M.D.

Dr. Rodman exhibited two patients upon whom this operation had been done by the method of Warren. Charts were exhibited showing the line of incision. The incision is placed at the point where the breast comes in contact with the costal wall and is three to five inches long. The breast is turned up, and a tumor lying in the upper quadrant easily reached and a V-shaped portion of the gland containing it exeised. The wound is closed by deep sutures of catgut. Dr. Rodman has done five such operations since the operation was presented by Dr. Warren in his oration on "Surgery," in Portland, in July, 1905.

The theoretical objection that the blood supply of the breast may be interfered with is met by the recollection that the breast is supplied mainly by branches that enter superiorly and at the inner aspect. The patients exhibited had been operated on about three weeks ago. The operation is only applicable to benign growths. It avoids all deformity. The two breasts are exactly alike in appearance, and until the operated one is lifted up, exposing the scar, it is impossible to tell on which the operation was done.

[1] Read March 7, 1906.

CEREBRAL DECOMPRESSION—PALLIATIVE OPERATIONS IN THE TREATMENT OF TUMORS OF THE BRAIN.[1]

By WILLIAM G. SPILLER, M.D.,
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AND
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REMARKS BY DR. SPILLER.

Palliative operations in cases of brain tumors are not new, and the temporary benefits to be derived in this way have been fully recognized by many physicians during many years. It has seemed time well spent to examine some of the reports of cases treated by trephining or other methods of opening the skull for the relief of pressure when a tumor could not be localized or, if localized, could not be removed. Unquestionably many cases are omitted, and yet a sufficient number have been collected to demonstrate that palliative treatment has an important place in cerebral surgery.

After a careful study of these cases and of the views of the different authors, it will be seen that the weight of opinion is decidedly in favor of palliative operations. The choked disk, headache, vertigo, nausea, vomiting, and, to some extent, the convulsions are all favorably influenced by this method of treatment. Relief from these distressing symptoms is by no means to be despised, even though the tumor is not removable. The relief from many of these symptoms is often permanent, *i. e.*, during the period the patient may continue to live, and, as the growth of the tumor

[1] Read March 7, 1906.

is not hastened by the palliative operation and may be slow, we are thankful for a means of removing the distressing symptoms of intense intracranial pressure.

My first case of palliative operation was in 1898, and the operation was performed by Dr. John B. Roberts. The marked improvement that occurred in that case, and persisted at least during several years and until the patient passed from our observation, convinced me of the benefit to be derived from palliative operations (Case 2 of our series).

In one of our cases headache was so severe that relief was demanded at once. Byrom Bramwell, as already mentioned, has attributed sudden death in some cases of brain tumor to the severity of the headache and sudden inhibition of the action of the heart. The patient to whom I refer suffered such intense pain that he could not be reasoned with and was not responsible for his acts. Occasionally, in his attacks of pain, he grabbed anyone who might come within his reach, and once bit his mother through the arm. The relief afforded in this case by a palliative operation has been most striking. Indeed, his relief from the previously constant pain has been so great that, as he expresses it, he is "lonesome without his headache."

In another case headache has been the symptom that above all others demanded treatment, and the pain in the head was associated with pain in the neck, shooting down into the upper limbs. The symptom-complex has been in large degree that of cerebellar tumor, but the pain shooting into the upper limbs has made me fear that the tumor was extending downward through the foramen magnum on the cord. Some years ago I had a case of this kind, and at the necropsy a flat tumor was found covering a part of the pons, extending into the posterior part of the fourth ventricle, and growing down on the cord for several inches. In that case the development of the symptoms in the upper and lower limbs was more rapid than in the present instance, and, therefore, I feel that the tumor in the latter case may be confined to the region of the cerebellum. If so, I have no explanation for the pain in the upper limbs. The decrease of this pain, together with the decrease

of the headache after the dura was opened at the second operation, gives me reason to believe that probably this pain of the limbs was indirectly caused by the cerebellar tumor. Headache and pain still occur occasionally, but the condition of the patient has been vastly improved by the removal of a piece of bone and by opening the dura over the cerebellum.

I am somewhat skeptical as regards disappearance of Jacksonian convulsions after merely opening the skull and dura if the convulsions are very frequent.

In one of my cases in which the brain was exposed by Dr. Edward Martin, and which will be reported by Dr. Martin and myself later, the tumor could not be found at the time of operation. The man was having five or six Jacksonian convulsions within an hour, and relief of intracranial pressure did not in any way check them. He died from exhaustion following the numerous convulsive seizures on the second day after the operation. After death a minute tumor was found nearly in the centre of the area exposed, but a little subcortical.

In a still more recent case under my care, in which fracture of the skull and subdural hemorrhage had occurred, trephining probably prolonged life about twenty-four hours, but did not in any way check the Jacksonian convulsions, which before the operation were as frequent as six or seven within an hour, and continued in weakened intensity but with equal frequency after the operation. Opening the skull does not seem to relieve acute irritation of the brain, but it is of benefit in chronic cases, as not rarely convulsions occurring infrequently have been rendered less severe by this procedure.

I have considered whether palliative operations can obscure focal symptoms. Bruns thinks they cannot, but the subject is one that has important bearings. It is probable that a small tumor will cause more local disturbance if the general intracranial pressure is increased, not only because the local disturbance is added to the general pressure, but also because any one part of the brain is more irritable when the disturbance of the brain is general. This, however, is not sufficiently important to prevent

palliative operation, and I would advise that this should be done before the general symptoms become very intense, and especially before optic neuritis has developed so far that blindness is likely to result. The apparent unanimity of opinion as regards the effect on choked disks of opening the skull makes the necessity of this operation at an early period very evident.

It is a mistake to regard palliative operations as a substitute for radical operations. The tumor should be removed whenever this is possible, and palliative measures are to be considered only when the tumor cannot be located or is too large for removal, or possibly is a glioma. Palliative operations only relieve, except in extraordinary cases such as those reported by Horsley. Codman's views that palliative operations are preferable to radical operations I cannot share, and would add that the argument he offers is insufficient, viz., that the former are less dangerous in the hands of inexperienced surgeons. No surgeon who has had little experience in operating on the brain should attempt the removal of a brain tumor, and before advising the attempted removal of a brain tumor I always enquire who is to perform the operation.

The experience of Horsley as regards atrophy of tumors as a result of palliative operations seems to be unique; at least I have found no other similar cases, nor have I ever seen any such result in any of our cases. Broca and Maubrac doubted whether Horsley was correct in believing that partial ablation of a tumor may retard the growth of the rest, but Horsley has observed atrophy of a tumor following a simple opening of the skull and dura. This is a striking statement. I have never seen arrest in the growth of a tumor following the removal of a part, but several times I have seen increase of symptoms result, and I dread the partial removal of a growth, especially if it is a glioma. It has seemed to me that the congestion of the tumor and of the surrounding tissue and the greater space afforded for the growth of the tumor, after partial removal, favor the rapid growth of the remaining portion. I am almost convinced that it is better to leave a tumor untouched if only a part can be removed, especially if the growth is a glioma. The attempt, I think, should never be made to remove a glioma;

and yet there seems to be no way to determine before operation that the tumor is a glioma. A patient has been under our care with the diagnosis of brain tumor and was operated on several times by Dr. Frazier. Each time as much of the tumor as could be seen was removed, and yet a return of the symptoms occurred soon after each operation, and when a necropsy was obtained the tumor (a glioma) was found to extend from the upper to the lower surface of one cerebral hemisphere.

I doubt whether it can be held that a palliative operation, by which the tumor is not partially removed, by relieving pressure, favors the growth of an intracranial tumor. Unquestionably the brain has protruded through the opening, as in the cases of Schlesinger, Frazier, and Cushing, but it seems a questionable proceeding to excise the protruding portion. The tumor has grown through the opening and on the outside of the skull (Jolly, Wiener, Putnam, and others). In Jolly's case it formed an extracranial mass nearly as large as the man's head. It seems unquestionable that life was prolonged in this case by the operation, although it is doubtful if life under such circumstances is worth having. In Jolly's case the clinical signs extended over a period of thirteen years. In the case that Dr. Martin and I observed, to which reference has been made, the symptoms of brain tumor had existed for eight years.

We have had some extraordinary cases in which the symptoms of brain tumor disappeared entirely or almost entirely after an opening had been made in the skull and dura. It may be thought that the growth of the tumor is arrested by the operation; this is possible, but doubtful. Internal hydrocephalus (meningitis serosa) or some other lesion may give the symptoms of brain tumor, and relief of intracranial pressure may cause great modification or disappearance of the symptoms. In some cases in which relief has followed palliative operations probably an incorrect diagnosis has been made; in others, the relief of pressure has permitted the tumor to grow slowly without causing many symptoms.

My views, as a result of my experience and of a study of the literature, are:

1. Palliative operations should be performed early in every case in which symptoms of brain tumor are pronounced and before optic neuritis has advanced far, especially when syphilis is improbable or antisyphilitic treatment has been employed.

2. Partial removal of a tumor, especially of a glioma, is a questionable procedure.

3. Palliative operation does not, under ordinary circumstances, cause atrophy of a brain tumor and probably does not arrest its growth; on the other hand, it probably does not hasten its growth.

4. Palliative operation is not to take the place of a radical operation when the latter can be performed without great risk to the patient.

5. In some cases the symptoms of brain tumor disappear almost entirely for a long time or permanently after a palliative operation. This result is obtained either by relief of intracranial pressure or by removal of some lesion (meningitis serosa, etc.) other than brain tumor, and yet causing the symptoms of tumor.

REMARKS BY DR. FRAZIER.

INDICATIONS AND TECHNIQUE OF CEREBRAL DECOMPRESSION.

Taking into consideration the fact that so small a percentage of brain tumors are "operable," and by operable tumors we mean those which can be accurately localized, approached, and entirely removed, it is not surprising that surgeons should have striven to devise a means of affording relief for the suffering of the otherwise hopeless cases. It has been estimated from variously collected series of cases that but about 4 per cent. of cases are operable. This is, to say the least, a conservative estimate and I have no doubt that with more accurate methods of localization and greater perfection in the technique this percentage will increase. Be that as it may, the fact remains that there is no inconsiderable number of people who, having brain tumors, present a group of symptoms causing them intense pain and discomfort, which cannot be relieved by a single drug in the pharmacopœia. As has been

said by a well-known neurologist (Ferrier, *British Medical Journ.*, October 1, 1898), "the dread diagnosis, *i. e.*, of brain tumors, so far as purely medical aid is concerned, is practically a sentence of death, either appalling in its suddenness or after months or years of lingering and often intolerable suffering." The symptoms to which I refer are the result of increased intracranial tension, whether the tumor be large or small, whether it be basal or cortical, whether it be in the cerebrum or in the cerebellum—vomiting, headache, and choked disk. In what way the increase of intracranial tension causes vomiting, headache, or choked disk does not concern us here. The fact remains that every one of these symptoms may be relieved absolutely by an operation which requires but a few minutes for its performance and is attended with no risk to life when performed under proper conditions and by experienced hands.

Let me say here, as I have said so often before in writing upon this subject, that the so-called palliative operation should be performed very soon after the diagnosis of brain tumor has been established, not waiting until a thorough trial has been given the mixed treatment, which usually means a delay of from six months to a year, because unfortunately there is almost invariably some improvement after the administration of iodide of potash, no matter whether the lesion be a gumma or a malignant tumor; under no circumstances waiting because the tumor cannot be accurately localized, because so frequently symptoms which would enable one to accurately localize a growth may not appear until the very last stages or may not appear at all during the patient's lifetime; and, finally, under no circumstances waiting more than a few days at the most after the development of a choked disk.

It is no exaggeration to say that the most distressing symptoms which develop during the growth of a brain tumor are those which have nothing to do with the situation of the growth. The patient may be inconvenienced by partial paralysis in a leg or arm; he may be more or less incapacitated if this paralysis is complete when the tumor is in the motor region; he may be annoyed and hampered by some disturbance of speech or hearing when the lesion is in

the temporal region, by some visual disturbances when the lesion is in the occipital region, by some impairment of memory if the lesion is in the frontal region; it will make very little difference to him whether his knee-jerks are exaggerated, nor will he care particularly whether the Babinski reflex is present on one side or the other; he will, to be sure, be worried somewhat by the loss of muscular or cutaneous sense if the tumor is in the parietal region, or by the ataxia of tumors of the cerebellum. All of these symptoms may cause the patient some annoyance, some worry, some anxiety, and unfit him for the occupation which he hitherto pursued. But he will not be the subject of abject misery he is when suffering from the more or less constant headache, which in its intensity is only to be compared in some cases with the pain of tic douloureaux; or when he sees, day by day, his vision growing dimmer; or when he is constantly nauseated and unable to retain food in his stomach no matter how carefully restricted his diet.

It is this group of symptoms, the outward expression of intracranial tension, for which the operation of cerebral decompression is performed. As to the indications for this operation some would even go so far as to say that owing to the number of failures to find the tumor, to the higher mortality attending a prolonged search, associated with exploratory incisions or punctures, owing to the large percentage of cases which are found by autopsy records to be inoperable, that we should be satisfied in every case with the performance of a purely palliative operation. This, however, seems to me to be scarcely a justifiable mode of procedure. In every instance the brain should be exposed when the tumor is believed to be situated in or near the cortex; realizing that if it is not visible when the cortex is exposed, the chances of finding it by exploratory incisions are very slight.

Technique. As in many other cases, so in this, we learn our lesson from nature. The relief which was afforded a patient by the tumor growing through the skull suggested the possible relief which might be expected from deliberately removing a portion of the skull. The names of the surgeons most closely identified with this operation are Horsley, Chipault, and A. Sanger.

My attention was first called to it by an article by David Ferrier, which I reviewed, appearing in the *British Medical Journal*, October 1, 1898, in which reference was made to a case in which Horsley, in 1892, exposed the cerebellum but failed to find the tumor. Six years afterward the patient writes: "I am pleased to tell you that with care my health is quite satisfactory. I still have the swelling at the side of my head, but it causes no inconvenience except being rather sensitive to touch. I also still have the weakness down the right side, but this is much better than before I left the hospital. Indeed it will give you an idea how much better I am, when I tell you I have been able to cycle for two seasons." In 1902, my attention was called to the report presented by Sanger at the Thirty-first Congress of the Deutschen Gesellschaft f. Chirurgie, narrating his experience with this operation in a series of ten cases.

The first opportunity I had to practise this operation myself was on November 2, 1903, in the case already referred to by Dr. Spiller, and since that time the operation has been repeated a number of times, more frequently in he case of cerebellar than cerebral lesions. As to the performance of the operation, the same precautions should be observed and the same scrupulous attention be paid to details which are regarded by those experienced in this field of surgery as essential to success. There are two points, however, which especially concern the operation of cerebral decompression, and may, therefore, be appropriately discussed at this juncture; one the selection of the site of the operation, the other the management of the dura. With reference to lesions of the cerebellum, the operation should be performed in every instance in the suboccipital region, that is to say, the bone should be removed immediately over the cerebellar hemisphere. In every operation for exposure of the cerebellum the bone is never replaced, and the possibility of finding and removing a lesion should be sufficient to compel one to make the opening at that point. There is no doubt but that some relief might be afforded from removing the bone from the vault of the cranium, but owing to the presence of the tentorium cerebelli the relief would not be so

great nor would the immediate effects of the operation be so decided. Almost as a routine procedure I have, in those cerebellar operations in which the lesion was not found, made it a practice to remove a portion of the cerebellar hemisphere, partly to facilitate exposure of the cerebello-pontile angle and partly for the purpose of affording greater relief from excessive intracranial tension. This additional step in the operation in my experience has not added to the risks or increased the mortality. It is not necessary to remove the bone from both sides. A bilateral suboccipital craniectomy is a very much more formidable procedure, would be attended with the loss of just twice the quantity of blood (in these operations the patient may lose a larger quantity of blood in a shorter time than in almost any other operation with which I am familiar), and from the cases under our observation has appeared to be unnecessary. The area of bone removed should extend almost to the median line, externally without opening the mastoid cells, not nearer than 2 c.c. to the foramen magnum, and 1 or 2 c.c. above the line of the transverse sinus.

When the operation is performed for the relief of lesions of the cerebrum a choice must be made between the occipital, the parietal, and temporal regions. For cosmetic purposes one would naturally refrain from making an opening in the frontal region, the scar and the resulting hernia cerebri would be too conspicuous and so unsightly. Under certain circumstances one may have no choice in the matter. I refer especially to cases in which, during the performance of an exploratory operation, the brain bulges so that it is a practical impossibility to replace the flap without removing the bone, so that no matter where the field of operation may be the permanent bony opening must be established at that point. If, however, before the operation is undertaken the operator realizes that the tumor cannot be removed, he must then choose between the regions already mentioned. Naturally, he will avoid the motor area, inasmuch as a hernial protrusion at that point might lead to functional disturbance of the motor centres. There remains, therefore, to be considered, the occipital and the temporal region, and of these two, the preference may be given

to the temporal region, because, as has been suggested by Sanger, the presence in that region of the temporal aponeurosis will prevent undue and unnecessary protrusion of the brain and will diminish the possibilities of a fungus cerebri, which might result from the continued pressure and atrophy when there is nothing but the scalp covering the hernia. In so far as the relief afforded is concerned, however, it matters not whether the opening is in the temporal, parietal, or occipital region.

The treatment and management of the dura is a point in the technique concerning which there is some diversity of opinion. It has been recommended that the radiating incisions be made in the dura in order to afford greater relief of tension and greater opportunity for the brain to expand under pressure of the rapidly growing tumor. It has been said that the dura is an unyielding membrane, and that the removal of the overlying bone alone is not sufficient to provide the necessary relief of intracranial tension. However true this may be theoretically, my own experience, limited as it necessarily has been, is not in accord with these views. Taking for example the patient whom Dr. Spiller has exhibited, it will be seen that though the bone alone was removed, the relief which has been afforded has been adequate and permanent, even though there has been little protrusion through the bony openings. However, in the case of a patient of Dr. Schofield, of Portage, Pa., referred to me by Dr. Mills, even though the dura was not removed nor even incised, a hernial protrusion has developed so large as to prove that under continued pressure the dura may stretch. This patient, a young boy aged seventeen years, was under Dr. Mills' care at the University Hospital, and presented symptoms pointing to an occipital tumor. Very careful exploration was made, exposing the various surfaces of the occipital lobe, but no tumor was found. There was, however, a lateral ventricle so distended that its posterior horn extended almost to the surface of the brain. The brain had bulged considerably through the opening, but collapsed as soon as the fluid from the distended ventricle was withdrawn. It was necessary to remove the bone from the flap before the edges of the wound could be approximated. Shortly

after the operation a hernia began to develop, probably as a result of the refilling of the ventricles and consequent increase of intracranial tension. The patient's symptoms were almost entirely relieved, and when we last heard from him, in December, he had gained forty pounds in weight, had no nausea, headache, or vomiting.

Results. A word as to the results of cerebral decompression. It will not be necessary to refer to all our cases; I will call attention to two or three as illustrating what may be anticipated whether the lesion is in the brain or in the cerebellum. As an example of the relief of persistent headache resulting from a cerebral lesion, I simply cite the case Dr. Spiller has already referred to, in which on successive occasions sections of bone were removed from the cranium. The results which were obtained in the case of the patient whose photograph is being passed around were equally gratifying, although the operation was only performed a little over a year ago. One of the most striking examples of the benefits to be derived from the operation was in the case of a young man, aged twenty-three years, whom, through the courtesy of Dr. Mills, I have the privilege of showing you to-night. This patient was admitted to the hospital on December 7, 1903, having every symptom of a cerebellar lesion, but none which would definitely localize the growth on one side or the other. His headache was intense and almost constant, vomiting more or less frequent, and with a bilateral choked disk of such a degree that the patient's vision was much impaired. His vertigo and ataxia were so marked that he could only stand when supported or by bracing himself against the wall. A left cerebellar craniectomy was performed in the usual way. In the course of the exploration one-third of the cerebellar hemisphere was removed. His headache disappeared almost immediately after the operation, vomiting ceased, and in the course of a week as he lay in bed he could see small spots on the ceiling. He left the hospital about two months after the operation, at which time his vision was almost completely restored. He is now a railroad employee, weighs 184 pounds, and, with the exception of occasional dizzy spells, says that he feels entirely

well. He certainly looks the picture of health. Nothing which I could write or say could make a greater impression or present a stronger argument in favor of the so-called "decompression operation" than the appearance of this patient two years and three months after the operation.

DISCUSSION.

Dr. Alfred Gordon: I recall a case similar to one of the patients exhibited in which the results were the same although the proeedures were entirely different. Three and a half years ago Dr. Keen had a case, a boy of nine years, referred to him presenting all the typieal symptoms of cerebellar tumor. After a thorough examination Dr. Keen hesitated to operate. The tumor was localized in the median lobe. I was asked to treat the case medically. The headaches gradually disappeared, at the end of several months the vomiting had ceased completely, and for the last three years the patient has not had a single attaek of headache or vomiting and is perfectly well. When first seen the patient was unable to walk or stand and later was completely paralyzed. He also had a marked nystagmus. At the present time he is absolutely well, except that he has some blindness; not complete. I do not wish to minimize the great results obtained by Dr. Frazier and Dr. Spiller in their operations, but simply want to put on record the successful internal treatment. The latter consisted of iodides in gradually increasing doses.

Dr. Charles K. Mills: For many years I have paid great attention to the subject of diagnosis and the operative treatment of brain tumors, and during the last few years have come to the conclusion that almost every case of brain tumor should be operated on either for the palliative effect or for the removal or partial removal of the growth, and this in spite of the fact that the majority of operations are not successful. I would place the percentage of operable cases rather higher than 4 per cent; much higher than 4 per cent., if you include partial relief as well as cure; probably not more than 4 to 6 per cent. of what might be called cure.

The first thing to do is to locate the growth if possible, and then operate for its removal or for the relief of the patient even if you believe that the size of the growth will probably prevent its complete removal. In the second place, operation should be undertaken for the relief of symptoms, such as headache and optic neuritis. Besides the two cases to which Dr. Frazier has referred I have had other cases in which relief continuing for a long time has resulted from simply opening the skull. In one case operated upon by

Dr. Frazier at the University Hospital a large amount of fluid was discharged but no tumor removed. The woman, who had been a patient of mine for a number of months, suffered such agonizing pain during the last weeks before the operation that it had become necessary to give her narcotics in large doses during the entire day and night. Many of the symptoms of the tumor still remain since the operation, but not the pain. Not long ago Dr. A. C. Wood operated in a case of brain tumor for me and for the physician who had originally called me in consultation, and, although the tumor was present, both the position of the opening and the size and position of the tumor prevented its removal. The patient lived for some weeks. Following the operation her suffering almost immediately subsided. Regarding the incision of the dura, my own view is in favor of letting the dura alone, or, if an opening is necessary, of closing it in the usual way. As in the case of the boy referred to by Dr. Frazier, I have seen great relief ensue if the dura remained intact or was tightly sewed after operation.

Relative to the selection of a site for palliative operation, if we cannot locate the growth it is best to operate over the right temporal lobe, this being a region of comparatively low functional importance.

Dr. G. E. de Schweinitz: I desire to add my testimony in regard to the value of trephining for the relief of choked disk when caused by brain tumor. There can be no question that increased intracranial tension in a certain number of cases exercises a large influence in the production of choked disk, and therefore, if reduction of such tension is secured by trephining, even when the tumor is not removed the results are good. As has been well shown, such palliative trephining should be performed early, especially in the choked disk of cerebellar tumor, which is almost sure to produce blindness, and valuable time should not be lost in the exhibition of medicinal agents to the exclusion of surgical procedures. Although it has been stated that the good effect of the trephining, in so far as the reduction of the swelling of the nerve-head is concerned, may be seen early, within a few days after the trephining, it is my experience that satisfactory results are not apparent much before the end of the first week. Occasionally within the first day or two after trephining there will be an increase in the nerve-head swelling, and sometimes I have observed a few fresh hemorrhages. This, however, is unimportant, if it is followed, as it usually is, by a rapid reduction in the engorgement edema. The important point, which cannot too frequently be insisted on, is that the surgical interference should take place early, before the pressure has destroyed the function of the optic nerve fibres. Not infrequently it so happens, especially in cerebellar cases, that the patients are almost blind when they come for examination, and under these circumstances, although the trephining may be of great service in relieving headache, it does not save sight. Indeed, I have sometimes thought that the slight remaining vision disappears more rapidly after the trephining, particularly if the opera-

tion has been associated with great loss of blood, which of itself might be the means of destroying the functionating power of the few remaining ganglion cells.

Dr. John B. Roberts: I think that the mechanical changes are easily understood and well recognized, and that what takes place is exactly the same as when we split the periosteum in periostitis of the tibia, or the deep fascia in acute thyroiditis, to relieve pain and tension. That which interests me particularly is the pathological condition present. Is it possible that the mere removing of mechanical pressure so far influences the growth of the tumor as to inhibit further progress? May it not be possible that there is, in some of these cases, swelling of the brain from a general condition and not pressure from a tumor? In some instances at least the diagnosis may be at fault, and the intracranial pressure be due not to a tumor, but to a general increase in bulk of brain from other cause.

CASE OF INCISED WOUND OF THE HEART ILLUSTRATING THE EASE WITH WHICH HEART SUTURE MAY BE ACCOMPLISHED.[1]

By JOHN B. ROBERTS, M.D.

There have recently been reported to the College several cases of suture of the heart. I, therefore, desire to put on record a case in which suture of that organ would have been very easy, if it had been deemed necessary for the safety of the patient. This case and the instances of heart suture reported by Drs. John H. Gibbon and F. T. Stewart[2] establish the value of the suggestion made[3] twenty odd years ago before the college.

A woman, aged thirty-eight years, was admitted to the Polyclinic Hospital on February 20, 1906, with a history of having attempted suicide by drinking laudanum and cutting herself in the left chest with a piece of glass. She was found some time subsequent to the attempt at suicide with a wound of the left wrist and an incision in the fifth intercostal space. The chest wound was three inches long and extended horizontally between the fifth and sixth ribs about two inches below the left nipple. The inner extremity was one inch to the left of the left margin of the xiphoid cartilage. The external extremity was half an inch to the left of the left nipple. The cut lay along the lower margin of the fifth rib and exposed the attachment of the diaphragm to the sixth rib just below the wound. The lower margin of the lung was exposed showing that the pleura had been opened.

The pupils were slightly contracted, but the woman was conscious. As I feared the wound had become infected, I made no attempt to suture it; nor did I explore it with probe or finger. The external wound was washed with normal salt solution and the edges mopped with bichloride of mercury solution one to four thousand. The opening in the chest was lightly packed

[1] Read April 4, 1906.

[2] Transactions College of Physicians, 1904 and 1905. [3] Ibid., 1883.

with gauze and covered with a sterile dressing. There was no evidence of hemorrhage. She was treated with stimulants for the moderate shock existing.

On the 25th the patient developed a pneumonia of the right chest accompanied by a great many rales. There was dulness of the left chest in the vicinity of the wound, which I took to be due to collapse of lung. The respirations were rapid and the temperature was about 101°. She was treated with dry cups, turpentine stupes, and pneumonia jacket. Internally she was given a cough mixture consisting of ammonium chloride and squill.

On the 28th a slightly colored discharge, coming out of the chest at each beat of the heart, was noticed by the resident physician, and a pulsating mass was seen at the portion of the wound toward the middle line. A drainage tube was introduced after emptying the fluid from the chest. Because the pleural effusion became foul and the temperature of the patient rose, the cavity of the pleura was washed out daily with boric acid solution (ten grains to the fluidounce). The drainage tube pulsated with the heart, against which it lay, like a sphygmograph.

Some days after her admission, I examined the heart carefully, carrying my finger around its left edge and feeling the split edge of the pericardium adjoining the collapsed and retracted lung. In front the pericardium could be seen slightly adherent to the surface of the right heart and a probe could be slipped a short distance between the two structures. Nearly the whole of the front of the left ventricle could be seen through the large opening in the retracted pericardium. A wound in the apex was discovered and was readily examined with the finger and probe. It was about an inch long and one-eight or one-sixteenth of an inch deep. Its edges had become rounded by reparative changes. It would have been exceedingly easy to have sutured it, had it been the seat of bleeding. The fact that a heart wound existed was not known until several days after the woman's admission. The retraction of the lung, occurring subsequently as a result of its collapse or inflammation, exposed the heart more fully. Then I did not deem it wise to interfere much with the wound, though I had the heart between my thumb and fingers in examining the pericardial wound. I was endeavoring to determine whether there could be pus behind the heart in the pericardial sac to account for the patient's fever. It seemed to me that the cardiac wound would heal by granulation without difficulty. It was not deep and was free from suppuration. The woman died on March 6th, evidently of the pneumonia, having had a few days previous to her death very rapid respiration, feeble pulse, and temperature in the neighborhood of 102° and 103°. The wound in the chest was being washed out without difficulty through a drainage tube and no evidence had been found of pus within the pericardium, which had become adherent to the heart.

Postmortem examination was not allowed. The husband, however, per-

mitted an examination of the chest through the wound. This enabled me to obtain the specimen presented. The upper portion of the heart has been mutilated, because of the difficulty of separating it, through the wound, from the large vessels at the root. The left lung was adherent to the chest wall, but was crepitant in its upper portion, non-crepitant and solid below. It was a good deal retracted from the position which it occupied when the woman was admitted to the hospital. Some purulent fluid was found in the pleural cavity. The pericardial cavity contained no fluid, but had a large opening in its lower and anterior portion, through which the heart protruded. The pericardium was attached to the upper portion of the heart by adhesions easily separated. The diaphragm was covered with lymph. The wound in the apex was over the ventricular septum and the lower portion of the left ventricle. It was for the most part confined to the region directly over the septum. In the specimen it is a little deeper than during life, because there was a slight laceration made at its base by the manipulations necessitated by the removal of the organ.

This history may well induce one to conclude that, in urgent cases of heart wounds or pericardial wound with hemorrhage, the surgeon need not take time to resect the costal cartilages but may quickly make a three inch or four inch cut through the fifth interspace to reach the injured organ for suture or ligation.

SOME EXPERIENCES OF A CONFEDERATE ASSISTANT SURGEON.[1]

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When I was complimented by a request to give an account of the methods of the medical staff of the Confederate army I was obliged reluctantly to decline because the circumstances under which I served did not enable me to obtain anything approaching an adequate acquaintance with the subject. With the exception of the first six months of the war, during which I was employed in Richmond hospitals, I served the whole time in the field, practically as an assistant surgeon; for, though I at length became surgeon, I preferred to remain with my old companions and friends in an inferior capacity rather than enjoy my higher rank with strangers, and I was so fortunate as to have my wish gratified. But the position of a Confederate assistant surgeon stationed with the men in the field was one affording only the most limited and meagre opportunities for acquiring a comprehensive and accurate knowledge of the methods of the medical and surgical service.

Still, the position of an assistant surgeon had its own peculiar features; and, after further consideration, I have concluded to attempt some slight description of an humble phase of a subject whose proper handling is, in its entirety, far beyond my knowledge and abilities. Even this little I shall be obliged to do most imperfectly. The lapse of time has swept out of my remembrance much that was once very vivid. In truth, I have not very greatly encouraged these recollections. Most of them are disagreeable, and even pain-

[1] Read May 2, 1906.

ful, to me. For though I rejoice that I allied myself with what I believed, and yet believe, was a righteous cause, and my conscience tells me that I at least tried to act well my part in the small sphere in which my lot was cast, I was, nevertheless, altogether out of my element; and I look upon my years frittered away in the army as that much blank, and as waste leaves torn out and thrown away from my book of life.

I must say, too, that, despite my long and intimate association with the army, I have never been able to satisfactorily realize that I was a soldier. The essence of soldiering is fighting, and, while we have fighting parsons in abundance, I do not know of any fighting surgeons. In common with the assistant surgeons of the Southern side, and, I suppose, of the Northern side also, I may venture to claim a share of whatever military glory is conferred by being often under fire—usually while in sheltered places; still, I have felt some degree of uncertainty in posing, on this account, as a warrior. I have, therefore, habitually put aside my military career, letting its incidents lie dormant, and reviving them only on peculiarly fitting occasions, and these have been few and far between. This consideration has kept me from joining the military organizations which have been formed by survivors of the war, and thus I have been deprived of that freshening and brightening of old-time reminiscences which these associations foster. My narrative will therefore, I fear, be notable for the scantiness of the addition it makes to the general stock of knowledge.

I might indeed be able to offer something in the semblance of a real contribution to a memorable history, had I not been, like so many of my compatriots, a victim of the disastrous contingencies of war. From time to time I made notes of many of my experiences and observations, and had gathered a considerable mass of this material. On a furlough home I left a large part of it there for safekeeping, but one day the house caught fire, and my papers were consumed. Another portion was in a trunk in a storehouse in Richmond; this was burnt at the evacuation. The rest was recorded in a notebook kept in my saddlebags. The saddlebags were left in a hospital on the retreat to Appomattox,

the hospital was captured and the saddlebags with it, and this finished me. Never was an ill-starred cultivator of the fields of knowledge more ruthlessly stripped of the hard-earned fruits of his labor.

I was anxious to improve myself in my profession and endeavored to assimilate all the information that came in my way. In reviewing my acquirements during my three years and a half of service in the field, I find that they may be summed up in the statement that I gained an excellent working knowledge of the art of practising medicine without medicines and surgery without surgical appliances. This knowledge is not to be undervalued, for it was eminently adapted to the time and circumstances, but it has now become rather antiquated, and, I must own, has not stood me in much stead since.

Not only must my account be defective for want of matter, but its manner also will be justly liable, in particular, to the reproach of great discursiveness. For this feature I must crave indulgence. All of value that I can communicate could, indeed, have been put in a very few paragraphs, but so brief and bald a statement could have elicited no interest, even had it gained a hearer.

Of my brief experience in the Richmond hospitals there is nothing novel to be said. It was at the very beginning of the war, when means and appliances were abundant, and there was no occasion to depart from customary methods. Afterwards I had but little to do with hospitals, and was never connected with one long enough to learn much of its economies. Of the Confederate hospital system and management I am therefore not competent to give an account that would be even approximately adequate.

At first the system of the medical and surgical departments of the Confederacy conformed to that of the United States, and it kept closely parallel with that as long as means permitted. But as these diminished, and exigencies multiplied, wide divergencies became imperative. Radical changes had to be made, and substitutions and makeshifts had to be adopted, the details of which my situation prevented me from accurately knowing and which, consequently, I cannot presume to describe. I must confine my

account to the outcome of it all as it showed itself in the service in the field, and, in fact, as it was outside the hospitals.

Our regiment had two medical men, a surgeon and an assistant surgeon. There was also a hospital steward—a kind of apothecary, whose duty it was to take charge of the case of medical and surgical supplies, and to prepare, or dole out, what was prescribed, and to act as general assistant to the surgeons. In addition, there was a man, familiarly styled the knapsack-toter, who carried a knapsack containing small quantities of the most generally useful medicines, bandages, isinglass plaster, etc., and whose special duty it was to be with the assistant surgeon on the battlefield. We also, of course, had stretcher-bearers to convey the wounded to the ambulances. These ambulances were very sad-looking and, for the most part, very uncomfortable vehicles, and their unfortunate passengers were apt to have a dreary ride of it.

When we were on the march, or in camp, and no outside hospital had been established, the surgeon was with the regiment and had supreme charge of all medical and surgical matters. Usually he divided the work with the assistant surgeon very equitably. All the surgeons with whom I was acquainted were social with their assistant surgeons. In quiet times they exhibited little pride of place, showing themselves patterns of equality and fraternity. But when a battle was imminent they were prone to become very lordly indeed, cavorting fussily around and ordering us assistant surgeons to move well up to the front, and giving us commands which, if we had obeyed them to the letter, would have been the death of us—after which they retired, or, to speak with accuracy, fled, to the shelter of their field hospitals. Sometimes, however, on these occasions, by a miscalculation, they would get in range of a shot; and I remember with peculiar satisfaction how we assistant surgeons were once much comforted by seeing a group of our chiefs knocked out by an unexpected cannon-ball which tore off the roof of a house under whose protection they were chattering in great glee, and gave each one of them a substantial spanking with the shingles.

If much sickness prevailed in a permanent camp it was customary to establish a brigade hospital in some comfortable house at

a convenient, or, as the case might be, at an inconvenient distance away. Thither the surgeon would repair, and reside there in enviable ease and freedom, leaving the regiment in charge of his assistant surgeon. In fact, it was the duty of the assistant surgeon to be with the regiment all the time, and thus he was obliged to share many of the hardships and privations, and some of the dangers, of the men. So far as the meagre comforts of military life were concerned he was not greatly better off than they. One great advantage, and on the march an inestimable one, was that he could ride. But the blessing of a horse was always alloyed with much anxiety. Often he would be tied up at night and be gone in the morning—strayed or stolen, and very likely the latter. This was a most disheartening calamity, and I was called upon to endure it several times during my campaigning.

The domestic economy of the assistant surgeon was much the same as that of the privates. Some years since I published an article in which I pointed out that hitherto no systematic account has been given of how the soldier in the field keeps house—how he provides for his dwelling, for his table, for his clothing, for his bed, and for the multitude of conditions which are the elements of housekeeping. I did not pretend to be qualified to give such an account, but I attempted a description of one feature, namely, how the Confederate soldier put himself to bed. As this topic is in some sort related to my theme, and as I have excellent reasons for believing that no one ever knew of my article but myself and the printers who set the type, and, especially, as I have at last gotten an audience, I will bestow some parts of it on you.

A precept which the soldier speedily learns, or, at any rate, speedily has taught him, is to dispense with superfluities. This species of self-denial is, as is well known, one of the most valued features of various systems of philosophy, and is much preached among civilians, though little practised by them. The genuine exemplars of it are soldiers; not, indeed, because they are convinced of its eminent moral worth and beauty, but because they cannot help themselves. Accordingly, with these philosophers, even a bed is a superfluity, and they are able to do without it.

Soldiers in the field do not keep very regular hours. Sometimes they sleep, like other people, at night; sometimes during the day; not infrequently, they sleep neither during the night nor day. In fact, for sleeping, as for whatever else they may have to do, all times and seasons are alike to them—it is done when and how they can. Still, soldiers are endowed—in some instances very richly endowed—with the frailties of human beings in general, and are thus very susceptible to comfortable surroundings; and they are perfectly willing to deposit their carcasses in civilized beds when they can get them. These, however, are not readily to be had in the field, and there the warriors are obliged to put up with such beds as they may be able to improvise, these being, for the most part, devices which a civilian would at once pronounce no beds at all.

In our permanent camps, especially where huts had been built, admirable beds were fitted up, some of which were, in fact quite as good as the box bed provided for the dog of a well-regulated family. In these camps, when there was a liability of a sudden outbreak at any time of firing from the confronting enemy, as, for example, was the case on the lines between Richmond and Petersburg, it was generally considered to be conducive to longevity to sleep in a hole in the ground. Fastidious persons, with whom perhaps I should class myself, while retaining the hole, built their beds along its upper border, taking care to have a substantial headboard, consisting of a good thick log. This log was set parallel with the enemy's line, and was meant as a receiver of bullets straying its way.

But it was when on the march that comfortable beds, while most longed for, were hardest to be got. Agreeable camping places were, however, not infrequent. Yet our experience was of infinite variety, and we soon learned to expect anything and to be discouraged by nothing. When on the march, our method of going to bed was always very simple. In general, we placed something between us and the ground, if we had anything suitable, as was not by any means always the case, and covered up with blanket or overcoat. Our trying times came with rainy weather,

especially when it was prolonged and chilly. Then, after a day's trudging through mud and water, tired to the bone, and wet through and through, we laid ourselves on the soaked earth, covered up with whatever was available, blanket, overcoat, or bushes, let the rain pour on and endured impassive, till perhaps the accumulated water, submerging mouth and nose, forced us to turn. It is easy to realize that such nights were horrible, yet, so callous to physical hardships like these does the soldier become, that, for my part, though I must have passed through scores of wretched nights during my life in the field, not more than four or five of them have left a marked impression on my mind.

It is paradoxical to speak of sleeping while marching all night long. These night marches were truly the times that tried men's souls. Can there be in human experience anything more ineffably dreary than to be dragging one's self on and on, step by step, the livelong night, with men and army wagons moping and blundering through the darkness, and checked every few feet by some disabled team? Yet, even under these distressing conditions, some of us could sleep—becoming veritable somnambulists, creeping and snoring in unison.

The crowning event of the soldier's life, of course, is the battle. It would be natural to suppose that the immediate anticipation of this portentous trial would banish sleep. Yet, this is not so. He may be deprived, it is true, by the contingencies of the situation of the opportunity for sleeping, but, should he get the opportunity, he is fully capable of using it. As far as I have observed, on the night before the battle the soldier's slumber is tranquil. As he lays himself down there is a thought of what is impending, an anxious thought, no doubt, but it is not of long duration. Then all is forgotten; he sinks into undisturbed and, I believe, generally, dreamless sleep; and, unless roused by some physical discomfort, rests till awakened by the appointed signals. He sees no ghosts, no forms of loved ones at home. He is as dead temporarily as, very possibly, in a few hours, he will be permanently. He sleeps like the condemned is said to sleep on the night before his day of execution. What

he feels at the moment of waking is a matter of individual temperament. In effect, the summons of the soldier to rise on the morn of battle is that solemn call, "Prepare to meet thy God!" and we cannot deem it derogatory to the bravest if he suddenly hears it not altogether unmoved. But the depressing emotion, if felt at all, is rapidly dissipated by the stimulating feeling of companionship with friends who are about to tread together the path that leads to glory, if also to the grave.

And when the fateful day has passed over and beyond us, and the night has come, it may be that it does not bring us rest, and that we shall not sleep. We may have to follow the fleeing enemy, or, ourselves discomfited, we may have to hasten away, soliciting the darkness to help us to some friendlier place. Or we may be so fortunate as to be privileged to sleep on the field of battle. Every one has often read of soldiers, under these circumstances, sleeping among the heaps of slain. Usually, the phrase "heaps of slain" must be taken as a rhetorical embellishment. The aspect of a battlefield immediately after the battle, hideous as it is, is seldom quite as bad as it is represented to be. Our standard descriptions of these scenes are commonly the idealized pictures of poets and other romantic persons who have assiduously cultivated peace that they might be spared to fitly celebrate war. Their statements, therefore, are often erroneous, or, if true, the truth is not infrequently overcharged with illusory ornament. Heaps of slain cannot easily be formed except under peculiar conditions, as when the fighting is desperate within restricted spaces. Generally, the bodies are scattered far and wide, with intervals, which are often considerable, between them. There is no need to sleep on, or in immediate contact with the dead, and only a very brutish or callous fellow would do so. In truth, in putting himself to bed on the battlefield, the soldier gets at a convenient distance from the corpses, drops down without much preparation or ceremony, and quickly sinks into profound, if not always restful slumber, for he is sadly worn and very weary.

But the very perfection of repose for the Confederate soldier was to sleep on the grass, on a balmy summer night, beneath

the benignant sky, with the bright stars, or better even, the mildly radiant moon, kindly beaming on him. Then he is lulled into peace with all the world, and grows charitable even towards his enemy. How soft his slumbers are, and, in his later years, how sweet their recollection—if the imminent Destinies, darkly busy, shall spare him.

He does not, at such a time, drop suddenly into oblivion, but lets his fancy stray homeward for awhile; and, be sure, if he is in the flush of youth, as so many of our soldiers were, his thoughts soon centre on some fair being whom he loves and who loves him, too, with affection not purer indeed, but yet firmer, and, to my thinking, sweeter than can nowadays prevail between young men and women; for the love of the Confederate boy and girl was the all-powerful, yet exquisitely tender love that has its birth amid great misfortunes and is nourished by profound sorrows shared by the lovers, each with the other.

Whatever Sancho Panza, Macbeth, the doctors, or other authorities have said in praise of sleep will be heartily endorsed by the Confederate soldier. It was his one solace when sinking under cold and wet, fatigue and hunger, and, most intolerable of all, under forebodings, too well grounded, of inevitable disaster. Happily, sleeping was one of his innate accomplishments; he had an alacrity for it, and a capacity for securing it which seldom failed him. Mostly, too, the sleep he got was of a gentle and benignant nature and he slept well. Alas! Alas! for earlier friends whom I saw fall asleep, and who have been sleeping now these forty years and more!

As for our food, while the surgeons during their sojourn in the hospitals may have had fare in some degree sumptuous, when they rejoined their regiments, they had to eat what the assistant surgeons ate, which was, except when some lucky chance brought an adventitious addition to the larder, just what every body else ate. In the early months of the war we fared sufficiently well; but then came scarcity, culminating, from time to time, in what was perilously close to famine. Corn bread and sorghum molasses was one of our luxuries; and, though in the last days

of the Confederacy especially we fed on the fat of the land, it was of the land of Nassau, consisting of hunks of pork, all fat and no, or next to no, lean, which we tempered with hoe-cake. Yet in those days, by some mysterious nutritive process, I myself gathered more flesh on my bones than I ever had before. But I lost nearly every bit of it on the retreat to Appomattox, and I have never been able to get back more than a modicum of it since.

When our medical duties were over for the day, we governed ourselves according to circumstances. If the troops were moving we went with them and partook of their adventures, whatever they might be. If we were in camp it was always, to me at least, a problem to know what to do to enliven the usually tedious hours. I preferred to read, if there was anything to read, which was only occasionally the case. Any book would do. At one camp I came across a war-worn copy of Shakespeare, and struggled on till I got nearly through the works of the great bard. It was a labor I had never accomplished before and haven ever ventured on since; and at many of its stages I felt kindly towards the criminal noted by Macaulay, who preferred the galleys to Guicciardini, and could understand the feelings of the military gentleman in the house of correction who chose picking oakum as against the History of Macaulay himself. Other devices for passing the time were playing cards or chess, chatting with one another, and strolling idly about. We were very gossipy, and discussed the news and scandal of the camp just as naturally as if we had been civilians.

When we chanced to be stationed in the neighborhood of families measurably well-to-do, camp life became quite agreeable. Then we grew commendably assiduous in the observance of our social duties. By a happy concurrence of circumstances our most convenient seasons for paying visits coincided with the family's meal times, and we always courteously accepted an invitation to partake of the repast. We endeavored to requite their hospitality by communicating to the old folks all the war-news we could pick up or make up, and by dancing with the girls;

and those of us who were gifted with the divine afflatus would sing for them.

I myself was greatly esteemed as a remarkably artistic vocalist and at these meetings did not churlishly hide my talent. I had but one number in my repertoire—a most mournful ballad made by me to the memory of a camp cat, which, in one of our too frequent starving times, had been caught, cooked and consumed by some of the men. An old man is prone to vaunt the triumphs of his youth, and I trust that you will bear with my vaingloriousness in declaring that the song itself was a marvel of poetic pathos, and that my voice, sweetly strong in lusty melody, was brimful of soul-shattering dolor; and that, in my opinion, I do not unbecomingly overpraise myself by stating my conviction that when I executed the threnody to the tune of "The Mistletoe Bough" and to the accompaniment of the cracked-pot rales of a junk-shop lute, the sorrowing Psalmist himself, had he been a listener, would have been tenfold more eager for wings like a dove that he might fly away and be at rest. I was also a notable dancer, and, while I admit that I was not conspicuously expert in the technicalities of dancing, I was gifted with a large share of suppleness, flexibility and endurance, and was renowned for my great feat of dancing full four miles vertically for each mile horizontally.

These gatherings, naturally, were favorable to the development and growth of the tenderer feelings, and the boys and girls here formed attachments. For, even in those stern and bitter days, courting and marrying went on in our desolated land much as they were going on under happier skies. Some of these attachments eventuated in the marriage of more than one of my own companions and friends. Of the girls with whom I myself thus became acquainted there was one in especial who comes vividly to my mind now. She married an officer of my regiment not very long before the end of the war, and during the unusually prolonged period we chanced to be stationed near her home her sunny nature showered brightness all about us. Her kind and gentle heart has long been stilled, for it was her fate to pass away amid gloom

and anguish in the last days of our humiliation and ruin. As I write of her at this distant time my heart is overflowing with tender recollections and impels me to pay my poor tribute to her memory.

Indeed, for us poor harried men, sorely beset and beaten down, it was indispensable to have the comfort and support that woman is so marvelously fitted to bestow. What would have become of us without our women it is hard to conjecture. The deeper we sunk the closer they clasped us; and when at last we were utterly submerged there they were with us still, nearer and dearer than ever. And it was they who raised us out of the pit. For their sake we proceeded to re-establish our homes and strove to mend our broken fortunes, in which efforts they gave inestimable help. From my own home, whose solitude is not lightened by the presence of wife or child, let me waft across the dusty years my benediction on the Confederate women—on the younger ones who made me happier by their companionship, and on the older ones who were ministering angels to the sick and wounded and despairing—nor shall I ungraciously withhold my blessing from good and loving women, all and everywhere.

These visits to the neighbors often extended quite far into the night, and during one of my nocturnal prowls I had the unspeakable satisfaction of falling in with a collection of jack-o'-lanterns —things I have never seen but this once. As my paper is painfully bare of scientific matter, and as jack-o'-lanterns are scientific phenomena, I seize upon them to help out my scanty stock. In common with all the little Southern children before the war I had been fully instructed by my African nurses and playfellows in the mystical lore inherited by them from their fatherland, and which they had assiduously cultivated and added to and improved upon. The jack-o'-lantern was one of their most valued specialties and they had put me in possession of so much circumstantial information concerning its eccentric and baleful peculiarities that in my earlier years I felt for it the most respectful apprehension. As we grow older, however, most of us grow more or less skeptical, and I had at length come to disbelieve in jack-o'-lanterns

almost altogether. But let no man doubt them. There are such apparitions, for I have seen them—at midnight, hovering over dead men's graves, under the solemn shadow of a church—just the conditions which had been prescribed by the most able among my African instructors. Moreover, it was asserted by them that the most favorable circumstance for evoking the appearance of a jack-o'-lantern was for the wanderer to be returning from a henhouse attended by its inhabitants. Whether this circumstance was in operation on the night in question I will not positively affirm or deny, for in the multiplicity of occurrences of a cognate kind any individual one is but too apt, in the lapse of years, to glide out of the recollection. I can only say that we indeed did not infrequently commingle foraging with our social pleasures.

The church had been used for a temporary hospital, and the men who had died there were buried near it. Not the least melancholy incident associated with warfare is the hurried and unceremonious sepulture that often unavoidably has to be accorded to soldiers who die while serving in the field. In the exigencies that beset an army actively employed there is but little time or opportunity for observing the elaborate decencies considered by civilians as indispensable at a burial. Indeed, the dead soldier may congratulate himself, supposing he is in condition to do so, if he has been buried at all—though I can say that no instance ever came under my notice during our war where at least this much was not done for him. The graves at the church were a group of five or six. They were, no doubt, very shallow, and perhaps the bodies had been interred without coffins. At any rate, the conditions for rapid decomposition were favorable, and this was going on.

As I approached I saw each grave marked out in its whole extent by a ghastly phosphorescent gleam floating over it. I got off my horse and made as critical an examination as I could. The light did not develop till the exhalation had risen some two feet above the grave. It was of a pronounced blue color, which, though pallid in its tint, was very distinct and conspicuously visible, and of uniform tenuity without glow or coruscation. It

was very sensitive to air currents, and I could make it vanish by a wave of my hand, but in a few seconds it would glide into sight again after a very ghostly fashion. Altogether the spectacle was one of great interest to me, and, though far less awesome than the vision that had been imprinted on my young mind, was not without impressiveness. Certain it is that not one of my old-time colored contemporaries, had he chanced to come upon it, but would have felt his soul shrivelling up within him as he gazed. Some few nights after this apparition I passed the haunted spot again, but the jack-o'-lanterns were gone.

In recalling the medical aspects of our life in camp, with the view of imparting something that you might think of value, I am greatly disappointed at finding that I have scarcely anything which is worthy of your attention. As to our methods, I may say, as a general statement, that we aimed to conform to the science of the time, though the restrictions to which our ever-increasing necessities subjected us often forbade the practice of it. We did not do the best we would, but the best we could. And what we knew of military medicine, compared with what is known of it now, seems small and of inferior quality. Particularly, the rigid antiseptic notions of these days did not enter our heads. We had correct ideas as to ordinary cleanliness and decency, and we policed the camp in accordance with them, but there was no excessive care, nor anything approaching the refinements of present-day sanitary science—such as were applied during and after the Spanish war. Yet the contrast in the results accompanying our crude methods to those attained in the later war is most obvious and most remarkable. Perhaps, then, when I say that our knowledge, in some directions, seems to have been inferior to that of this time, I use the proper word, and that, in fact, the condition was more seeming than real. It is much the habit of arrogant youth to belittle the knowledge of the old. But inquirers whose researches lead them to study the work of their quite remote predecessors are constantly surprised at the learning and ability of those ancient men, and very well know that to the question so triumphantly propounded, "What would the ancients say?"

to this or that modern exploit, that the ancients aforesaid would not seldom be fully authorized to say something crushingly uncomplimentary.

Early in the morning we had sick-call, when those who claimed to be ill or disabled came up to be passed upon. Diagnosis was rapidly made, usually by intuition, and treatment was with such drugs as we chanced to have in the knap-sack and were handiest to obtain. In serious cases we made an honest effort to bring to bear all the skill and knowledge we possessed, but our science could rarely display itself to the best advantage on account of the paucity of our resources. On the march my own practice was of necessity still further simplified, and was, in fact, reduced to the lowest terms. In one pocket of my trousers I had a ball of blue mass, in another a ball of opium. All complainants were asked the same question, "How are your bowels?" If they were open, I administered a plug of opium; if they were shut, I gave a plug of blue mass.

The prevailing diseases were intestinal disorders, though we had a share of almost every malady. Occasionally we suffered seriously from measles. Smallpox was effectively kept in check by vaccination. Intermittent and other malarial fevers at times incapacitated regiments to an extent which was really portentous. Our management of these various diseases presented, as far as I know, nothing unusual or novel. None of the well-developed cases remained long under my care, for they were sent from the camp to the hospital to be treated by the surgeon. When I have sometimes modestly advanced the statement that, during all my army experience, I never lost a case of fever, or of pneumonia, or, indeed, of anything else, except when the subject had been slain outright, captious members of the profession have said that this was because I sent the men off before they could get a chance to die. This explanation seems plausible only because the fact is true. I will not waste time in controverting it, but content myself with saying that my reputation as a successful practitioner was much higher with the regiment than was that of the surgeon, who, it was universally perceived, lost a good many cases that

lived as long as I had them, and died only after they fell into his hands.

A modicum of surgical practice was furnished by the accidents that occurred. These were not as numerous, nor, generally, as grave as the inherent carelessness and recklessness of the soldier temperament would warrant us in expecting. One source was the unexploded shells which were apt to be pretty plentifully scattered over the ground after a battle, and particularly so in localities where we were camped for a time in the neighborhood of the enemy. Under these circumstances there was often much artillery firing indulged in for inappreciable reasons. No one minded it much, and, on the whole, the missiles were more dangerous after they had come to rest than in their flight. It was the delight of the men to tinker with the unexploded shells, and, opening them, to drain out the powder and peck out the balls with which they were charged. As this operation was not always thoroughly done the discarded shells, which were carelessly thrown aside, could still be very formidable should a spark from a pipe or a fire reach them.

To one of these shells I owed the promise of a case of transcendent surgical interest and instruction, and worthy to be reported in the journals as rivalling, or even surpassing, the celebrated crow-bar case, where the implement passed through the victim's brain without materially damaging him. One afternoon a good old Rebel was making ready to solace himself with the unaccustomed refreshment of a copious mess of apple dumplings, which he was boiling in a pot supported over the fire by help of one of these imperfectly eviscerated shells. In due time the pot was blown up with a report that roused the whole brigade. I hastened to the spot, and on approaching the veteran was astonished at the spectacle he presented. Apparently, all his brains had literally been blown out and bespattered him from head to foot, while, notwithstanding, he was not only erect, but was able to move about and his head was still whole—a marvelous pathological phenomenon. You will fully sympathize, I have no doubt, with the keen disappointment I felt when a minuter

investigation showed that it was not his brains, but the apples from his dumplings. As for him, he was unhurt bodily, and mentally was not visibly moved by the grandeur of the blow-up of the pot, which all the other beholders agreed was uncommonly sublime, though the loss of the dumplings, which had been scattered to the four winds of heaven, affected him profoundly.

Normally, we were scant of medicines, and, generally, they were of the commoner kinds. At times, however, we were well supplied, and with excellent preparations. These times would be when captures had been made, or medicines of Northern or European manufacture had come through the blockade. The Confederate pharmaceutical laboratories worked industriously, but under great disadvantages, and their output was, in many directions, not surpassingly excellent. Among other things they made blue mass. This would have been a very satisfactory product could its components have managed to keep themselves in harmonious juxtaposition; but, as it was, it would not be long after the mass reached us before the mercury seceded from the rest and settled off by itself at the bottom of the holder. The loyal residue we used for its appointed ends, and the rebel mercury we sometimes utilized to circumvent the inferior forms of life that trod in hosts with equal foot the general careering on his charger and the private wallowing in his mud-hole.

On the battlefield our stock of medical and surgical supplies was particularly condensed. As for the latter, we had chiefly a pocket-case of instruments, plaster and bandages. Bandages were plentiful, but we seldom had splints. We could usually find some makeshift for these. On one occasion I used a whole fence-rail for a broken arm, being unable to do any better. I had just finished making the rail secure when a turn in affairs forced us to take to flight. My patient started to run with the rest, but the distal end of the heavy rail tilted downward, stuck in the ground, and jerked him up short at every step. I do not precisely know what became of him, but unless he had the sagacity to turn round and retreat backward I fear I was instrumental in delivering him into the hands of the enemy.

Our most valued medicament was the alcoholic liquors, which were furnished to us sometimes in the form of whiskey and at other times of apple brandy. These preparations were esteemed by the surgical staff very generally as a specific for malaria especially—a condition which was very prevalent, and to which the surgeons with whom I was associated believed themselves to be peculiarly susceptible. Feeling that a breakdown on our part would work irretrievable detriment to the country we patriotically strove to ward off the calamity by instituting a grand sanitary soirée on the night of the day on which the supplies arrived in camp, where we would tone up our systems and corroborate our constitutions by drinking up every drop of the prophylactic before morning.

It is a remarkable circumstance that the medical purveyor, learned as he admittedly was in medical science, was never able to grasp the fact, which was knowledge of the most elementary kind to us, that army surgeons are specially cursed with a malarial idiosyncrasy, and, on the other hand, that they are blessed with a special adaptability to the remedy. He appears to have gone no deeper in the matter than to note that, however large the quantity of whiskey and apple brandy he issued, credit for a surplus had never been known on the records; whereat he marveled much, and in his replies to our requisitions would couple his expressions of wonderment with painfully injurious surmises and commonplace explanations of the deficit suggested in very plain terms.

Apparently, the Federal medical department was troubled with similar perplexities, and it had devised a method for quite effectively obviating them. This consisted in thoroughly embittering its whiskey with quinine, or some equivalent atrocity. I infer that this was their method from the fact that our brigade, on one occasion, captured a large keg of their liquor. Our surgical staff was then in one of its run-down conditions, and undertook to build up on this tonic. It was found to be a very intractable process, and resulted in our formulating the opinion that to mix quinine with whiskey is a pharmaceutical mistake and a practice to be reprehended.

As alcoholic liquors were indispensable on a battlefield, it is conceivable that the sudden and complete vanishing to which they were liable might at some time prove to be a very serious matter. And so it would have been but that one of our staff, being in tolerably constant communication with his own home, where there was a distillery, was able to keep on hand a full keg of his own, from which he would generously supply the rest of us when an exigency required it.

We were devout believers in the old medical aphorism which declares that "wine is the milk of age"—old age, middle age, any age. We had no wine, only whiskey and apple brandy, but they would do. In these latter days something of a reaction against alcohol as a remedy has come. However it may be in civil practice, where substitutes of equal efficiency may possibly be attainable, I have not the least doubt of its surpassing utility in military practice on the battlefield. In truth, I am constrained to think that the present day hostility to alcohol is not founded on accurate scientific knowledge so obviously as on infection by the recklessly active crusade against it which is a marked feature of our time. It may be true, as we are told, in the Women's Christian Temperance Association's school physiologies, that alcohol will cause the tissues of warts and corns to degenerate, crumble away and disappear, to the great sorrow of childhood, which is prone to look upon these appendages with pride; and a special appeal has been made to the consciences of such military men themselves as would rather be entombed in the stomach of a buzzard than not be buried at all, by the terrifying statement that these birds turn with indignant disgust from the bodies of liquor-swilling soldiers dead on the battlefield. These may be formidable objections to the use of alcohol, but the military surgeon of my day would have thought that they were offset by the fact, demonstrated by innumerable instances, that it promptly rallies the deep sunk spirits of the wounded soldier, and snatches him from the jaws of imminent death.

The profound shock induced by severe gunshot wounds, and the tendency of soldiers to vastly exaggerate the gravity of trivial

ones, have been constantly noted by writers on military surgery. These injuries are indeed capable of cowing the most courageous soul. During one of the greatest of our battles a Confederate general, deservedly famous for his bravery, hurried to my station on the field in piteous perturbation, convinced that he was mortally wounded. He was copiously treated from our black bottle, and after a rather inordinate quantity of the resuscitator had been taken—for, in deference to his rank, he was allowed to adjust the doses himself—he rallied sufficiently for me to make an examination. He had been struck by a bullet which had made an abrasion of considerable length, but exceedingly superficial, on the right leg of his boot—and this was all. He would not believe it till he had cleared his intellect by a few more doses of the restorative, when he admitted the correctness of my diagnosis, and returned to his command, where he fought with his accustomed courage to the end of the action.

I may here be permitted to remark that the terror of soldiers is a somewhat curious phenomenon, with peculiarities which might repay investigation. While their intrepidity is displaying itself in deeds of the most exalted courage it can, in the twinkling of an eye, collapse into the most abject cowardice. Julius Caesar himself, if we can trust the report of Cassius, flunked badly on more than one occasion. Says Cassius—

> "I did mark
> How he did shake; 'tis true, this god did shake;
> His coward lips did from their color fly."

And there is the memorable instance of the Great Frederick, of all warriors perhaps the most consummate, who fled the field already won. Many soldiers, officers and privates, whose courage had been tried and approved by the severest tests on innumerable fields, have told me that there were times when there would come upon them an almost overmastering fear under circumstances in no way peculiar, and which would not adequately account for it. It is a characteristic of the human mind, of which I question if there has ever been a single adverse instance, that

its noblest qualities, assidnously cultivated and guarded with the utmost care, will now and then, from some vague cause, become uncontrollable and temporarily give way; and perhaps the most we can in justice require of even the steadiest of our fellow mortals is that these lapses shall be few and not the habit of the mind.

For my own part, I freely admit that I was never in a battle but that I should have felt the most exultant joy had I been out of it. In all, however, I contrived, somehow or other, to bear up more or less satisfactorily except in two of them—the battle of Malvern Hill and the battle of Sailor's Creek. At Malvern Hill I was still ill with a remittent fever which had attacked me a few days before. The battle was raging and we were hurrying forward to take a place in the line when suddenly I felt like Julius Caesar, shaking all over and my lips and their color parting company. A horrible fear took possession of me and I was in a deplorable state physically, mentally, and morally. During a halt I was directed to intercept the stragglers, who were becoming numerous, and send to their commands those who were not demonstrably unfit for fighting. This was a most humiliating duty, for I was painfully conscious that I was lording it over many a man who was worthier than myself. Apart from my illness, which I had not regarded as disqualifying me for service, there was nothing in the circumstances of this battle more formidable than what I had encountered many times before. Yet my dread was extreme, and, as it turned out, was entirely unnecessary, for our brigade did not get into the action.

I was afterward in a great many other battles, but in none did this hideous sensation recur till in my very last battle of all, which was the battle of Sailor's Creek, three days before the surrender at Appomattox. Here my large and varied store of military experiences was enriched with the knowledge of how it feels to be part and parcel of a thorough-going panic. Hitherto it had been my inexpressibly good fortune to be with, or, at any rate, behind, men who, though occasionally compelled to fall back, knew the art of doing it with decent precipitancy. I was now with these men, and on the firing line itself, for they were

doomed, and I was resolved to share the fate of my old friends and comrades whatever it was to be. But, though bullets were flying copiously, I felt no extraordinary apprehension. In fact, fear was driven out by despair, for all of us knew that this was our last stand, that overwhelming defeat was certain, and that escape would be well-nigh impossible. Every one of my regiment who was engaged in this battle except myself and a slightly wounded soldier was killed or captured. The somewhat singular manner of my own escape is a story that might be worth telling if this were the place for it.

In the cataclysm that occurred I managed to associate myself with another regiment, which was retreating at a double-quick. Behind us musket-firing, cannonading and yelling were incessant and tremendous. For awhile our retreat, though rapid, was remarkably orderly, and I trotted along on foot—for I had lost my horse—in reasonably good spirits. But presently a little unsteadiness manifested itself, which quickly became a decided wobble, and then, in a moment, as though it had exploded, the whole organization flew to pieces. It was a wonderful and startling sight. These heroes of a hundred glorious fields had instantaneously lost their manliness and become reduced to the grade of a flock of terror-stricken children. It did not take long for me to be thoroughly infected, and I got over the ground with amazing celerity, unimpeded by the reflection that I had not the least idea of whither I was going. The fact is, I was in very light marching order, having little on my outside and nothing at all inside except a few grains of intractably flinty corn, which I had been munching for the past two days. The risk of being killed was imminent, for not only did the pursuing enemy keep up their fire, but many of our own men, preserving even in their panic the noble soldierly instinct of returning a fire, as soon as they heard any one drawing near to their rear, would throw their guns back over their shoulders, blaze away, and, casting the weapons from them, would race on with redoubled energy without turning their heads to see at what they had fired. Yet, in this, the very presence of death, I had absolutely no fear

of it. It was not this that gave wings to my feet—it was the dread of capture. This misfortune had never before presented itself to my mind as something that might not be endured with fortitude, but now for some reason the idea of it took complete possession of my soul and overwhelmed it with horror and dismay.

In their headlong flight the men lightened themselves of their arms, knapsacks, blankets, of whatever impediment they could get rid. And so we plunged along, puffing and blowing, enveloped in all the hideous noises of battle, helter-skelter, higgledy-piggledy, each for himself, God for nobody, and the devil take the hindmost—by the nine gods of war, I swear it was a mess. In the maniac rush, though a few dropped out, and, cowering behind trees, yielded prematurely to their fate, the great body kept together, and at length coming to a broad road, cheered by its ample and unobstructed track, they turned into it and fled along it pell-mell. In great extremities early religious impressions are apt to force themselves upon the mind, and now I vividly remembered that instructive old hymn which admonishes us that

> "Broad is the road that leads to death,
> And thousands flock together there;
> But wisdom shows a narrow path,
> With here and there a traveller."

And accordingly I shot across the road into a field, and ran and ran till I fell down gasping for breath and with my tongue hanging out of my mouth. From this lair I saw a troop of Federal cavalry come galloping and yelling down the broad road in hot pursuit of my late companions, whose career in a few minutes thereafter was brought to a disastrous close. But I had escaped, and ultimately got to Appomattox, where I wandered around till the surrender—a vagabond soldier, friendless, starving and utterly miserable.

The panics of trained soldiers must, however, be regarded as abnormal phenomena, and it would be most unjust to view them as evidences of dishonoring cowardice. The fact is, that in an army, courage is as plentiful as blackberries, and much more so.

It was rare indeed to find a man who failed when the test was applied. On the day of the battle of Gettysburg, whose terrible gravity was foreseen by all of us, a day remarkable for the enervating and sickening heat of the weather, when sick-call was sounded in my regiment not a man responded and not one asked to be excused from duty. And so, too, the surgical staff everywhere and on all occasions displayed all the courage that was necessary, but, fully realizing that it was their function to heal wounds, not to receive them, and with minds clarified and enlightened by the elevating character of their studies and pursuits, very judiciously forbore to exhibit a superfluous amount of it.

But it was on the battlefield that the assistant surgeon was in his own sphere, for it was the method of our service for him to be with the troops when they were in action, that he might render immediate aid to the wounded. Here he did his strenuous work. Abandoned by the surgeon to his fate he had to depend upon himself, and here was sternly tested whatever he possessed of resource, fortitude and self-sacrifice.

It was the custom of the assistant surgeons of our brigade to work together for the benefit of mutual help. As the troops advanced we kept with them and closely scrutinized the locality in the search for places suitable for stations, noting trees, fences, straw-stacks, depressions of the surface, or whatever offered a show of shelter, and especially looking for gullies, which were the most desirable of all. It was necessary for these stations to be near the engaged men, and we could not always find a satisfactory place; and sometimes our only protection while ministering to a wounded man was by sitting, or even lying, with him on the ground. We, however, were blessed with the inestimable privilege of having among us an assistant surgeon who was one of Nature's born topographers. He was intuitively skilled in dynamics and conversant with parabolas and trajectories and the relations of the angles of incidence and reflection, and possessed an instinct for the line of most resistance. He was also an adept in the calculus of probabilities, and, moreover, had an exquisitely developed

antipathy to every kind of personal wound or injury. This gifted man took an energetic part in the selection of our stations, and to his opinions and judgment the rest of us paid the greatest deference.

As the men moved forward to get into position they would not infrequently be under heavy fire, and we assistant surgeons had to maneuver against it the best we could. When line of battle was formed it was often the case that we were in it, and there we remained till some one was wounded, and, as a wounded man could not be allowed at the front, we had the opportunity of an honorable retreat with him to our station in the rear. I will not hypocritically assert that in those days I was ostentatiously pious, but when I was under these baptisms of fire it was my wont to pray as devoutly as my religious knowledge and experience qualified me to do that I might be spared merely till some one else got hit—and I was particularly fervent in the aspiration that this might befal right speedily.

During my first battle I was in the thick of it the whole time without shelter, having been ordered by the surgeon in his final injunction, before he decamped, to stay right with the men, and in the novelty of the position I did not know how to care for myself. The bullets whizzing past me were for awhile rather dismaying, but, finding that I still lived, I heartened up gradually, and the longer I lived the greater the assurance I felt that I was not to die, till presently I stood the fire with an equanimity that astonished me. But after the battle, when I betook myself to serious reflection, it occurred to me that to be shot at by innumerable people for indefinite periods was a somewhat risky adventure, and I made a vow that for the future I would indulge in it with frugality—a vow which I faithfully kept; or, when I broke it, my conscience is clear that it was from no sinful compliance of my own.

We shifted our stations, when it became necessary, to conform to the movements of the fighting line, and it was our good fortune to very seldom have to fall back. Our surgical work was usually very simple, though often there was enough of it to keep us fully and laboriously employed. It consisted chiefly of the application

of plaster and bandages and the administration of stimulants, and superintending the placing of the badly wounded in the ambulances for transportation to the field hospital. No elaborate surgical procedure was undertaken unless there was urgent necessity for it. Sometimes a very extended area was fought over, and wounded men, both our own and the enemy's, would be scattered about it, often, if the country was wooded or otherwise difficult, in out-of-the-way places, whither they had wandered. When the battle was ended, if our troops had possession of the field, we had to hunt up these unfortunates—a duty willingly performed, though not infrequently an arduous one.

The army with which our group of assistant surgeons served was long triumphant, and during this time our lot was reasonably endurable; but at last the change came, and our lot changed, too. Our tribulations began the day following the breaking of the Petersburg lines, and a strenuous day it was for us assistant surgeons. Its history was made up of a diversified series of marches, halts, ambushes and sudden attacks, ending late in the afternoon with a break-neck race for a bridge over a protecting stream, and the hottest kind of pursuit thither by the Federal troops. Our staff got over the bridge safely, but many of our companions were cut off and caught on the other side. It was on this eventful day that I first had experience of the military formation called the hollow square, of which I had a historical recollection from its Napoleonic association with "Asses and savants to the center." My judgment of it was that the center was an eminently proper place for an ass, for no one else would put himself where he would be the focus for the shots from every side. The square was formed when attacks were made upon us by unseen enemies as we passed through bodies of thick woods. On these occasions I preferred to remain outside the square and gyrate around a tree.

This day inaugurated a week of unspeakable woe. Of its hardships and perils the assistant surgeons bore an equal share with the fighting men, having no option in the matter. Our surgeons were not with us, for they remained at the field hospital when we began our pilgrimage, and had their independent

adventures. I do not remember seeing any of them again till I was approaching Appomattox, where at least one of them eventually arrived with heartbreaking accounts of troubles of his own.

The roll of surgeons slain in the Civil War is, I believe, not of impressive length; nor do I know that vast hosts of assistant surgeons perished in the conflict—though I have heard that one or two of them were killed. That they were susceptible, under favorable conditions, to slaughter is, I think, shown by an experience of my own at the battle of Gettysburg. Our station on this field had been selected by our medical topographer with his utmost art, and seemed an ideal one, being a little dell in a grove conveniently in the rear of the troops. Here we had a large collection of apple-butter pots, gathered from the surrounding country, which were filled with water to be used for the wounded. Feeling eminently secure we lolled and waited for the battle to begin. It began with that furious cannonade which is remembered as the most thunderous that has ever shaken the earth. It was appalling to us, for our topographer had by some strange misapplication of his recondite learning contrived to place us in the very centre and focus of the fire. In a moment the air was filled with limbs of trees, scraps of butter-pots and yells of fleeing medical men and knapsack-toters. I undertook to keep company with my companions, but my horse, young and restive, had tangled himself in a tree and I could not immediately extricate him. I was thus for some minutes made an involuntary witness of the impressive spectacle. It is impossible to describe it. I question if in all civilized warfare there can be found anything more sublimely awful than the crash of a broadside of cannon-shot through a stockade of apple-butter pots. I did not, however, linger unduly to contemplate it. Having at last released my horse I moved off with him without mounting, pacing along with the dignity befitting my professional character dashed somewhat with briskness. I had gone only a little way when I suddenly felt what I have seen described in accounts of hangings as a dull thud. Dull as it was, it was sufficiently sharp to convince me, for the moment, that I was slain; and I remember that I was much

troubled in mind to know whether I had been honorably put to death by a legitimate missile, or had been ignominiously butchered by a butter-pot. It did not take me long to discover that I was still living and in tolerable condition. It is true that one leg had been paralyzed by the shot, but, by way of compensation, the function of the other had been proportionately exalted, and on this I hobbled vigorously away, and at length reached a sheltering gully, where I investigated my injuries. I found that there was nothing more serious than the loss of three or four cubic inches of tissue, which had been scooped out of me; and presently by slow degrees and with much cautious maneuvering I retraced my steps toward the field of battle. On the outskirts of the field I encountered the colonel of my regiment with nearly all his teeth neatly and effectively extracted by a bullet received in the mouth. He could, however, speak sufficiently plainly to tell me that I could not go on without being killed, and I understood him very well when he ordered me to go back.

With the pardonable vanity of a veteran who has been battered in the wars it has always been a delight for me to relate this incident. Particularly, when, some years since, I taught science to the boys and girls of the Richmond High School, where I at times relieved the aridity of scientific details with accounts of my military experiences, was I accustomed to narrate this piteous story with much feeling. The girls especially would become deeply touched with sympathy for the sufferings of their teacher, and perceiving no obvious marks of injury anywhere on my person, but full of that kindly curiosity which is so amiable a characteristic of the female sex, these tender-hearted little beings would exclaim, "Oh, poor Doctor Taylor! Where were you wounded?" To this affectionate inquiry I could only reply simply, "At Gettysburg;" for to their untechnical minds it would have conveyed no information to tell them that it was in the gluteus maximus muscle.

Whenever I speak of the battle of Gettysburg my mind reverts to something which, though it is hardly pertinent to the subject of my paper, I trust you will not be unwilling to hear—and it is about a parson. Much laudation has been expended on this

and that "fighting parson;" but, as far as I have observed, there has been a notable dearth of specification of the feats of arms he did. Perhaps it will not be deemed invidious if I make some mention of a certain praying parson and of a particular prayer he offered, when I was present and knelt with him. It was on the battlefield of Gettysburg, and just before the battle.

As far as I know, the incident was unique in our armies. A great array of war-battered soldiers baring their hearts and pouring out their very souls in united appeal to the God of battles as they were about to march into the jaws of death is something not likely to sink out of the notice of him who was part of it; and yet I have seen no mention of such a thing among the innumerable reminiscences of the war. It has been my fortune to witness much that was grand, that was sublime, that was terrible, but nothing has ever stirred the profoundest feelings of my nature as did this prayer before the battle. I have no language fitting to describe the solemn impressiveness of the occasion. We were then at rest, and all around was a quietude ominous in its stillness. The day was glowing with summer brightness, the landscape was pleasant to look upon, but our circumstances were too fateful to permit even young and ardent men to utterly dismiss foreboding thoughts. Our chaplain asked us to join with him in prayer, and all of us knelt with him on the ground. He prayed for us, fervently for all of us, and most beseechingly for those to whom it had been appointed to die this day; but most touching of all was his remembrance of the dear ones in our distant homes, who, we knew, were at this hour anxiously thinking of us and mingling their prayers with ours. He ended and turned away weeping, knowing that with some of us he had communed for the last time in this world. He could not foresee how very great the number was to be whose faces he was to behold no more, for whom he was not to be permitted to perform the last rites, but whose burial was to be what the victor deigns to give the vanquished.[1]

[1] The brigade to which I belonged (Garnett's) lost in Pickett's charge at Gettysburg sixty-five per cent., and every officer of my regiment, from colonel to corporal, was either killed or wounded.

The term "fighting parson" has, I must confess, to me a discordant sound. I cannot say whether this is because I have old-fashioned notions, or, as I think is more probable, because I am a primitive Christian without knowing it. It is certain, however, that all the Confederate chaplains were not fighters, but that some of them left fighting to be done by people whose duty it was to do it, and were mere ministers to the spiritual needs, and often, very often, to the bodily needs, too, of distressed and sorrowing soldiers. This sort of thing was not very glorious, but there were times, as many of us old Rebels can recall, when such ministrations were more grateful than would have been the putting to rout of a whole regiment of Yankees by the chaplain. Very little has ever been said of these humble workers, but I do not clearly see that if the surgeons, who were in safe nooks two or three miles away from the turmoil and danger of battle, are to parade as military heroes, why the chaplains, who were in these places with them and shared their safety, should not partake of their glory too.

One of the chaplains of my regiment did transform himself into an actual fighting parson, serving as an aide to a general. One afternoon, in the lull of one of the desperate battles marking General Grant's advance on Richmond, I found him lying dead on the field. He had been shot while on horseback, and his attitude afforded a striking example of the condition known as cadaveric spasm, and was a startling reproduction of one of the Masonic signs.

As a final observation I remark that, from the standpoint of the army surgeon, the horrors of war have been vastly augmented by modern advances. The long-range weapons of these days will compel surgeons to establish their hospitals farther from the battlefield than our surgeons placed theirs, which assuredly were not set up abnormally near. An old Rebel surgeon will be devoutly thankful when he considers that in his times of stress, as the enemy hurried him hither and thither, he was at least spared the anxiety of looking out for his sterilizing plant, his *x*-ray machinery, his cans of turtle soup, lobster, and plum pudding, and his corps of female nurses.

Here I conclude my rambling narrative. It was never my chance during the war to meet with any surgeons of the Northern armies. But one of the surgeons of the regiment to which I was attached had this experience, having been placed in charge of some of our wounded who were in the hands of the enemy. On his return to us he gave a most appreciative account of the hospitable and fraternal treatment he had received from the Federal surgeons; and I have heard many Confederate soldiers speak most gratefully of the solicitous attention bestowed by the doctors upon them when they were wounded prisoners. These are pleasant instances of amenities that now and then softened the grimness of fratricidal warfare. From all that I have ever learned the surgeons both of the Northern and the Southern armies adhered sacredly to that principle of our beneficent calling which will not permit us to classify human misery by race, or creed, or political opinion, but leads us instinctively to extend our succoring hand impartially to any afflicted fellow man. The loving memories of the cause for which I made my poor share of sacrifice, which well up from my heart and will not be restrained, are not inconsistent with my profound gladness that my countrymen are again united. Our own profession, bound together by ideals that pertain to all humanity, could never be much severed by the conflict, and since it has ended our union has been growing ever closer and more brotherly. Time and events have obliterated former asperities, and I know that you have a fraternal regard for the few Confederate surgeons yet lagging on the stage. You have shown your consideration for one of the humblest among them by listening to his slight story of experiences often hard and bitter, though told in light words and, he fears, in trivial form—a story which he will hope may have somewhat in it to exalt, if only in a small degree, your kindly feeling for them all.

SOME REMINISCENCES OF A CONFEDERATE SURGEON.[1]

By HERBERT M. NASH, M.D.,
NORFOLK, VA.

In accepting your very kind invitation to read a paper on the experiences and difficulties encountered in the performance of the duties of a surgeon in the Confederate States army during those frightful four years of passion and carnage when the people of the different States, North and South, irritated to a point of exasperation by years of political strife incited by both politicians and fanatics, seemed to have insanely divested themselves of mutual forebearance, and of that spirit of compromise which alone rendered possible constitutional union at the very beginning of our national life, and rushed madly into internecine war, I have done so reluctantly and with great hesitation, being not unmindful of the unique position I was to occupy in addressing this body of distinguished physicians whose reputation for medical scholarship and general scientific attainments is not confined to this city of Philadelphia, now as ever in the past a great centre of medical science, nor to the great State of Pennsylvania, but is known to the remotest parts of our greater country and to the world.

I have, however, consoled myself in remembering that wherever my travels have carried me in quest of knowledge, at home or abroad, I have ever, whether provided with credentials or without them, found the most courteous treatment from my medical brethren; and I believe that I shall now, in this poor

[1] Read May 2, 1906.

attempt to relate what I may on the subject to be considered this evening, receive and indulgent criticism

There are but few authentic publications remaining from which to draw and to substantiate any statements that may be made. The archives of the Confederate Surgeon-General's Office with their priceless records and reports from surgeons in the field and from the numerous hospitals established throughout the South for the reception of the sick and wounded, were all consumed in the conflagration that destroyed so great a part of the city of Richmond upon its evacuation in 1865.

While that great work, the *Medical and Surgical History of the War,* published by the Government of the United States, describes many cases of wounds of Confederate soldiers falling into the hands of Federal surgeons (some of whom have been made the subjects, at least by one of your number, of most interesting fiction), the number has been necessarily limited; but could those burned reports have been saved an immense amount of data, accumulated in the course of those eventful years in that office, might have added much to the statistical value of those volumes. There was published under the auspices of the Surgeon-General's Office, in Richmond, a monthly medical and surgical journal, containing much of interest to the medical officers. There were eighteen numbers of this journal issued, but I have been unable to collect them all, and I shall then have to rely chiefly upon memory, and, though more than forty years have intervened, I shall not call upon imagination for aid. Some years since, Dr. Joseph Jones, while Surgeon-General of the Confederate Veterans' Association made a most laudable effort to obtain from the Southern State governments and from living ex-Confederate surgeons some positive data as to the number of troops and of the wounded; but the information thus obtained, though considerable, was mostly of a fragmentary character.

From the evacuation of Norfolk, in 1862, to the day before the surrender at Appomattox Court House, April 9, 1865, I had kept a diary in which almost daily entries as to occurrences, not only in my own command but in other divisions of the army, obtained

from the chief and other surgeons, were noted, especially as to the casualties of the skirmishes and battles, from Seven Pines (Fair Oaks), May 31, 1862; the battles around Richmond in June and July; of the skirmishes on the Rappahannock; in the campaign against Pope and preceding second Manassas. Here I was detailed to collect and care for the wounded of this advance. A vacant but roomy and open church building was secured and these men were gathered in, their neglected wounds cleansed and dressed, splints made and applied, and under water-dressings principally, a hospitable neighborhood having supplied us with everything in the way of food and delicacies. There were but few deaths from mortal wounds, the other cases making excellent progress to recovery. One of these men had been shot through the right lung at Manassas, and with little or no surgical attention had trudged all the way back to our hospital on foot. He suffered but little from difficult breathing, was always cheerful, and soon returned too duty, fought in subsequent battles and is still living and gaining his own livelihood without a pension.

Securing transportation for these patients to the general hospitals, I rejoined the army just after it had recrossed the Potomac after the battle of Sharpsburg (Antietam). The diary notes of the march of the army from the valley, over the Blue Ridge to the neighborhood of Fredericksburg. In the cold, frosty weather of that fall hundreds of our men, many reared in plenty and even elegance, had no covering for their feet other than sandals made of the fresh hides of the cattle slain for their food, fastened by thongs, the hair being inside next to the feet, tolerably comfortable while they were still moist, but galling to the feet when dry and stiff. There were interesting notes of the battle of Fredericksburg, of the great battle of Chancellorsville, of the march again northward into the valley and of the battle of Winchester, of the entry into Maryland and thence into Pennsylvania, where I was astonished to see on the march so many thousands of fighting age in citizen's dress apparently unconcerned about the tragedies of the war and perphaps doing their fight-

ing by proxy; of the battle of Gettysburg, and the leisurely return of the unsuccessful army to Virginia; of the forward movement of Lee to attack Meade in October, 1863, and of that officer's hasty retreat towards Alexandria; of Meade's return to Culpepper, and of his flanking movement to find Lee again across his path at Mine Run, and where Meade again declined battle and recrossed the river; of the incidents in winter quarters of 1863-4, when the younger officers and men of the artillery of Hill's corps, to which I was now attached, and nearly all of whom expected to return to college again if not killed in battle, sent to the University of Virginia for text-books, had regular hours for study when not engaged in military exercises, and at night by the light of fatted-pine torches (candles not to be had), when mathematics and Latin and Greek authors were studied with deep interest under the supervision of our chaplain, himself a scholar of no mean pretensions. Joining these classes, I soon found that after a long neglect of the classics the effort to construe Horace was no easy task, especially while seated on a log, and by the light of a pine-knot.

My diary also contained notes of the following battle of the Wilderness and its casualties, and of the fire which toward its close swept through the tangled mass of undergrowth to the right of the plank road, and, spreading over the late scene of conflict for miles, almost blinding the moving troops with its dense smoke and incinerating numbers of the dead and helplessly wounded lying amongst its mazes.

Here I may mention an incident. Grant, after the fighting of May 6th, moved off by his left flank. Our cavalry in following came upon one of his large field hospitals with many wounded, and among them not a few Confederates who had been shot down in the charge upon this part of the Federal lines. My friend, Surgeon C. W. P. Brock, went forward to collect our wounded in his field hospital. The surgeon in charge finding himself and assistants captured, inquired of Brock whether he intended to take away his medical supplies, and was informed that the Confederate government did not make war on the sick and wounded,

that he only wished to remove his own men and the facilities for doing so. Brock at once paroled the Federal surgeons and men. In return for what he considered such generous treatment he presented Brock with quite a liberal supply of what he most needed. Another incident here. A sergeant, McBane, of Ypsilanti, Mich., fell into Brock's hands, having been mortally wounded by a shot through the bowels. Brock was obliged to tell him that he had but a few hours to live. The sergeant asked Brock to do him a favor, to take possession of his money and portable effects, and whenever he could to transmit them to his old mother. This was done by the Confederate surgeon upon the first opportunity by flag of truce; received by her and acknowledged by a letter of thanks some months later. I may also note here that the rations of our army during the winter and spring had been scant. Beef was rarely dispensed. One pound of flour or cornmeal with one-third of a pound of bacon or pork, with such vegetables as the men themselves could obtain, constituted their subsistence. At the beginning of the campaign, though the men were hopeful, cheerful, and ever ready to march or fight, many were anemic and scorbutic. Out of seven leg and thigh amputations in one command, May 6th, six died within a short time, while out of seven other shot fractures dressed and secured for transportation by long splints, six recovered after more or less tedious confinement.

The scene now changed to Spottsylvania Court House, where Lee again interposed himself across the path of Grant, and the great battle of May 12th, when Hancock's corps under cover of early dawn and fog desperately assaulted that famous angle occupied by Johnson's weary men (many of whose guns were stacked during the night while they rested, and the barrels of which filled with water of the heavy rains that so often succeeded the heavy firing of battle, were almost useless at the time most needed) and captured nearly the whole division with its guns. The line being soon readjusted it was thereafter held. It has always been a mystery to me how these brave assailants ever got those captured guns to the rear, as the roar of musketry and artillery was

continuous at this point from early morn till night. This assault, or series of assaults, by Grant's men rendered ever memorable this salient where was done the fiercest fighting of the war.

The surgeons were kept busy for several days. Amputations and resections were numerous, the latter of which were in many cases remarkably successful.

Grant now crossed a force over the North Anna River, but finding us in battle array, recrossed, only to meet Lee again at Cold Harbor, where his army recoiled from the slaughter of his columns charging upon the hastily constructed earthworks of Lee's wan and worn men. Here our losses were comparatively light, though my own immediate commander was severely wounded and my young and gallant friend, Lieut. Rives, one of the winter-quarter students, was killed. To show the concentration of the fire at one point on our line, one of Poages' gun carriages was marked by one hundred and forty-odd bullets and all of his horses of the exposed batteries killed.

The diary told of Grant's change of base by crossing the James; of the long siege of Petersburg with its many flanking battles and some daring assaults; of the battle of the Crater and its hand-to-hand fighting and where bayonets were freely used, and finally of our retreat towards Amelia Court House, only to be disappointed in getting food and supplies previously ordered to be at that point; of our continued march or retreat toward Appomattox Court House. Many a time since then would I have given thousands to have saved that diary and the exact facts it contained, but alas! it was also burned with my supply wagon on the evening of the 8th of April, 1865, the evening before the surrender. I had many rough experiences during the four years of the war, but that evening brought to me the climax of disaster.

My first duty after entering the service of the State of Virginia, in April, 1861, was at the post of Craney Island, five miles below Norfolk. It was soon well fortified but never attacked by the U. S. naval forces, as was Sewal's Point just opposite and a little below us. The post was healthy, and but little sickness

occurred and also little excitement until the naval battle of Hampton Roads, in which the Confederate ironclad "Virginia" (Merrimac) sealed forever the fate of wooden war vessels. My first military surgery was done on the evening of the eighth of March, when for the time being I became a naval surgeon, by boarding the Confederate gunboat "Beaufort," Capt. Wm. H. Parker, to treat her wounded of that day's battle. These men, after receiving their dressings, were soon conveyed to the naval hospital. The killing and wounding on this gunboat occurred while receiving the surrender of the U. S. frigate "Congress," and was done by Federal troops and the shore batteries after that ship had surrendered.

In the early spring of 1862 some thousands of militia went to the department of Norfolk to be drilled and fitted for the ranks and field service. Like all troops drawn from country localities, in a short time hundreds came down with measles, which in the depressed and homesick condition of these men soon became very fatal and complicated with a form of jaundice and erysipelas. The medical officers of the adjoining camps, completely worn out by the constantly increasing numbers of the sick, who were dying in spite of their efforts, appealed to the chief surgeon to be relieved of this extra duty. In casting about for some one to undertake this task, Dr. DeLeon came to our post and entreated me to volunteer, as he averred he was unwilling to issue a peremptory order to such disagreeable duty. I at once told him I would volunteer provided he would honor any requisition I might make, to which he assented.

I found on proceeding to the camp and hospital where the cases were, a plentiful supply of food and medicines. I now sent in my requisition for a barrel of whiskey and the best band of music in the department, to be under my exclusive control. The men were in a desperate condition, ill and hopeless. After a few days' illness a yellow tinge would first appear on the forehead, soon spreading over the face and followed by the blistering of erysipelas. Some were moribund. Separating the worse cases from the others, I went from bed to bed with a bucket

of milk toddy and such other stimulants as were necessary; had the band play cheery tunes almost hourly in the grounds, and tried to cheer and encourage them with the assurance that the worst features of their malady were over and that they would soon be well again. From the third day after taking charge there were no more deaths. Here was an example of psychic therapeutics practised forty-four years ago, and which is at the present day said to be entirely of recent origin.

I may mention that at the battle of Seven Pines, May 31, 1862 my command reached the battlefield late in the afternoon, after wading through water in the roads and lowlands from two to three feet deep with which the heavy rains of the day previous had flooded the country. We soon came upon the camp of Casey's division of the Federal army, which had been defeated and driven off in the morning's fighting. The abandoned purveyor's tent, well stored with medicines, liquors, dressings, and other appliances, amazed us, and being fair prey our surgeons soon replenished their depleted supplies.

A grape-shot after rebounding from sapling to sapling, expending most of its momentum, had entered the skin of the neck of a soldier at the thyroid cartilage and passed around to the nucha, from which it was extracted without doing serious injury to the man.

After this battle, in which General Joseph Johnston was wounded, General Lee having taken command of the army, the troops were ordered to resume their former positions. Our losses at Seven Pines were 4,798, killed and wounded, but little less than the Federal loss, and shows how hotly contested was the fight. Our wounded were rapidly transported to Richmond in all sorts of conveyances, from a one horse cart to the family carriage, as we had not yet been furnished with a complete supply of wagons and ambulances, as was subsequently done by our army's great quartermaster, General N. B. Banks.

There were numerous large tobacco warehouses in Richmond, the most commodious of which, together with the old Exchange Hotel, were converted into hospitals for the care of

these wounded. Another interval now elapsed, both sides preparing for the struggle that was surely to come. McClellan now greatly extended and strengthened his lines, and shipped to the rear his large numbers of sick, for his advance up the peninsula was attended by thousands of cases of malarial fever and intestinal disorders.

We also suffered from these causes, as many of our unacclimated Confederates came down while traversing the marshes and slashes of the Chickahominy. While lying behind earthworks about two or three feet in height, erected just within a body of dense woods, and having in our front a field about a third of a mile in width, on the far edge of which the picket lines were established, and between which and those of the Federal army there was frequent and annoying firing, I shall never forget these cold June nights preceding the battles around Richmond. Sunshine rarely penetrated the shades of these woods. On one occasion I was sent across the muddy field in our front to attend two men on the picket line reported as being poisoned. I found the men sick from frying their food on a newly varnished spade. In returning to our lines I took the York River Railway, accompanied by a drummer boy who carried my field knapsack, in order to avoid the mud of the field. We had scarcely gone two hundred yards when a Federal battery heretofore concealed opened down the railway. Each side of the railway was too steep and slippery to ascend, so we quickened our pace to get under cover of quite a sharp curve in the road to escape the shell. The first shot went over our heads, the second fell short, but the third struck the knapsack in the right hand of the drummer and whirled him around violently into the ditch, doing little harm to the boy, but playing destruction to the knapsack. We were now not long in getting around the curve. On another occasion while here a severe fusillade broke out on the picket lines and demoralized men came in reporting our lines broken. The General's aides had been sent off on other duty, and being near him, he ordered me to go to the front, ascertain the real condition, and report to him. I merely remarked as I went that this

was novel duty for a surgeon, trudged through the mud in the darkness, and expecting to be shot every minute by the excited men for a Yankee, soon found both ends of the broken lines, urged the officers to close them up, and returned to report, and received an apology from the General for having sent me on such an unpleasant duty. In all subsequent engagements he cared for my personal safety by directing me to a sheltered position when the firing became hot, that I might perform my duties with more serenity of mind.

It would be out of place here to describe the series of battles around Richmond from June 26 to July 2, 1862, ending with Malvern Hill; the daring attacks of Lee's forces, or the splendid resistance under Fitz-John Porter, who commanded the Federal right wing. Having in these battles always to attack the most skilfully constructed field works and abatis, the Confederates were the heavier losers, the capacity of our hospitals was fully tested, being soon filled with wounded by shot and shell, and the skill of our surgeons was now to be demonstrated. They had become more expert in their art, and worked faithfully day and night until all had received the aid of the best surgery that day could devise. The best and most skilful operators in the South were called in to assist and advise the officers of the hospitals.

These improvised hospitals, originally intended for the manufacture of tobacco, the comfort and solace of the soldier and sailor, as soon as the summer heats succeeded, became infected. The severely wounded began to show evidences of putrid conditions—erysipelas, gangrene, etc. Many were lost, but an astonishing number slowly recovered. The Confederate wounded were also received and treated in many private residences in Richmond, which policy, owing to its manifest danger, was afterward discouraged. The intense local congestion preceding those conditions was in many cases sought to be controlled by ligaturing the principal arterial supply of the parts affected, initiated by Dr. Henry F. Campbell, of Georgia, who was complimented by Druitt on the procedure. The operation proved beneficial

in a number of cases but not in all, as the later view of infection would readily explain.

Had the illustrious Pasteur, who was engaged during this war, 1861–1865, in proving to the world *the truth* of his theories of the causation of fermentation and putrefaction, in demonstrating the agency of germs in such processes, established his facts a few years before, how many brave men of both armies, might have been saved to their country! Oh! what war he had to wage, chemist as he was, but destined to become the greatest revolutionary every known in medicine, against the French Academy of Medicine, the very men who should have commended instead of bitterly opposing him. How slow were medical men in Europe in comprehending Pasteur's great argument. But one great man across the channel, Lister, listened with a receptive mind to what was stirring scientific medicine in Paris, inaugurated a system of treatment (1867), and, creating antiseptic surgery, was not long in publishing his successes to the world (1869–70). Yet so little progress had Pasteur's established truths, and Lister's methods, which were instituted as a consequence, made in France itself, that in the first battles of the Franco-Prussian war (1870) its teachings were entirely neglected, and a horrible mortality amongst their wounded in battle followed and the fetor of suppuration and gangrene was recognizable wherever they were. France now felt in that brief but terrible war of heartless conquest all the bitterness of defeat.

So conservative are the leaders in medicine, that notwithstanding Pasteur's work in 1860 and 1865, Lister's experiments and reports in 1869–70, and Tyndall's great lecture in 1873, giving full credit to the French scientist, and his second public lecture in 1871 on "Spontaneous Generation," reiterating his faith in Pasteur's experiments, still Dr. Pepper, whom we all revere for his scientific acumen, in his *System of Medicine*, published in 1885, treated the whole subject of germ causation of disease as *sub judice*, and only publicly acknowledged his change of belief in 1893.

To return from this digression. The experience of this summer of 1862 with infected hospitals led to the erection in Richmond of capacious open pavilion hospitals built of lumber, allowing at every point free access of air. The Howard Grove Hospital had a capacity of 2500 patients, Camp Jackson 2500 cases, Chimberazo Hospital 7800 cases, and Camp Winder 7800 cases. These hospitals had divisions, each for 100 patients, with a surgeon and as many assistants as were necessary for each division. The Richmond Almshouse (capacity for 500), was the hospital for the Federal prisoners. One of these hospitals was also established in Manchester, opposite Richmond. The old Seabrook warehouse alone was retained as a distributing hospital.

Until the latter part of 1863 the supplies of quinine, chloroform, and other medicines were quite sufficient, and only subsequently, when blockade running had become irregular and finally suppressed, did our sick and wounded really suffer for the proper supplies. Then it was that barrels of decoctions of the various indigenous tonics, containing whiskey enough to prevent fermentative changes, were distributed in lieu of quinine, from one fluidounce to two fluidounces being the ordinary dose, repeated as necessary in intermittents and as a tonic. Having always had an eye to future scarcity, I had systematically economized and was rarely without either quinine or whiskey and chloroform. One gallon of whiskey and an ounce of quinine, and such chloroform as was actually needed, were the monthly allowances for a regiment or battalion.

In fact from the fall of 1862 till the surrender, the Army of Northern Virginia was an extraordinarily healthy body of men, though often worn out, with insufficient food, sometimes ragged and shoeless, but always willing to do their utmost. The opinions of all the Confederate surgeons with whom I have consulted coincide in the statement that the percentages of losses in our hospitals since 1862 were much less for all classes of wounds than those reported in the U. S. government *Medical and Surgical History of the War*. All of the Confederate surgeons were examined by a board as to their qualifications and re-examined

for promotion. The incompetent were finally gotten rid of in this manner. Battle wounds received in winter were less successfully managed as a rule than wounds in summer. These remarks apply more particularly to the Army of Northern Virginia, but it is well known that the armies of Johnston, Bragg, Hood and others were under the care of many of our most competent surgeons having equal facilities for supplies.

In Chimberazo Hospital between 40,000 and 50,000 cases of wounds were treated during its existence as a hospital. In it there was never a case of gangrene and but little erysipelas; not a case of smallpox ever developed in its divisions. It had a system of force-pump baths accommodating 300 men at the same time. It also had hot sulphur baths for skin diseases, in which the camp-itch was sucessfully treated. Smith's anterior splint was generally used in shot fractures of the thigh, but when unmanageable by this splint the leg was simply extended and thus retained so that the dressings could be frequently changed. It was the custom of all of these hospitals to remove all and every threatening case out into tents. Vaccination was constantly practised in all hospitals. There were provided at Howard Grove Hospital accommodations for smallpox cases when they occurred. Out of the number of wounds treated as above mentioned at Chimberazo eight thousand died, during its existence—a moderate mortality. When medical supplies were becoming scarce the Surgeon-General, S. P. Moore, had laboratories established, two being east and one west of the Mississippi, where medicinal extracts of excellent quality were manufactured and castor oil and peanut oil were made in quantities, the latter as a substitute for olive oil. Shot wounds of the skull, sometimes appearing insignificant, where no fracture could be discovered and operation was deemed unnecessary, often resulted in death from cerebral abscess. Surgeon Porcher, of South Carolina, edited and published under the same auspices, an invaluable epitome of the choicest medicinal plants and roots of the Southern States, including the mode of curing and preparing them for market and their therapeutic value. Under the same auspices was published

in Richmond a small volume on operative surgery, to which was appended correct wood-cuts illustrating almost every practical operation likely to occur in military surgery, including the various amputations, the ligaturing of arteries and resections, which were briefly but clearly described. This book was sent gratuitously to every Confederate surgeon, and was very much appreciated by them.

Chemical works were established at Columbia, South Carolina, under the charge of Dr. Julian Chisholm, and were beginning to demonstrate their value when Sherman made his practically unobstructed march to the sea, during which remorseless destruction was the order of the day, and Columbia with all it contained was destroyed by the torch.

I omitted to mention an interesting incident, occurring during the siege of Petersburg, while General Butler was endeavoring to dig his canal at the great bend of the James River at Dutch Gap, to save six miles of circuitous navigation below Richmond, Poages' battalion of artillery was sent to the river bottoms on the right bank of the river to annoy his work by shelling his excavating machines. The battalion of four hundred men was thus engaged for five or six weeks, in July and August, 1864, when malarial fevers of every type attacked our men, so that scarcely enough of the whole number could be had to man the two mortar batteries in use upon the banks of the river. There was no quinine issued at that time and the men were treated with decoctions internally and friction of turpentine to the spine and twenty drop doses internally. These cases all recovered. I shall ever thank Dr. George B. Wood for my knowledge of the value of turpentine as a remedy, and especially in typhoid fever, notwithstanding that a later popular author (Osler) dismissed it as being inferior to salol. The fact is that Osler knew nothing of turpentine as a therapeutic agent. While the men were thus suffering with malaria (we knew nothing of the plasmodium then) the horses became affected with blind staggers and many died. Without horses the artillery could not be moved, and they could not be replaced. I made autopsies and found the brains

and meninges affected from simple congestion of the latter to abscesses of the former. I became convinced that the same or a similar poison was acting on both men and horses, and rode to Richmond, reported the facts to the Surgeon-General and appealed to him for an issue to myself of a dozen ounces of quinine with which to treat the horses. He at first declined to issue the quinine for horses when he could not issue it for the men. I replied very earnestly that this was a most extraordinary condition which should be combated with every possible available means, and that I should be obliged to report to army headquarters the object of my visit and its results. Seeing the intensity of my conviction he finally relented and gave me the quinine, with which I speedily returned to the bottoms, to drench each horse as soon as the symptoms appeared with one ounce of quinine to the quart of water. But one such dose was given to each sick horse. I am glad to relate that not another horse died, and I subsequently had them removed a mile back from the river to the pines, when the cases of staggers ceased to occur

But to continue the disjecta-membra of this ill-digested narrative of my experience. After the Richmond battles, the Army of North Virginia was soon on its way to the Piedmont region again, whither Jackson had preceded us, and at Cedar Run, August 9th, had defeated Pope's right wing under Banks, and as usual gathered the fruits of his victory. When our corps, Longstreet's, was pushing Pope, who had now wisely ordered a general retreat towards Washington, our troops in these forced marches were frequently beyond reach of the commissary wagons. Upon arriving one night at Clark's Mountain to bivouac we were without food, the three days' rations being exhausted. The regimental commissaries had during the day collected many wagons full of green corn from the neighboring fields, the only food distributed to the hungry men that night. Diarrhœa had had been quite troublesome on the march, and I feared the consequences. But, strange to say, not a man complained of diarrhœa again for some time. The change of diet worked wonders. After second Manassas, Lee was obliged to leave behind many

valuable men, who were without shoes, before entering Maryland.

While skirmishing on the Rappahannock there were frequent artillery duels across the intervening river. On one occasion I found my station near the batteries exposed to an enfilading fire. The roadway to the river had to be crossed before a better one could be secured. Every few minutes a shell would come screaming through the open roadway. Watching the flash of the Federal guns, I ran across safely, but my poor drummer boy followed me too closely, was struck by a shell, tearing and lacerating his left thigh, causing him to sink rapidly into shock and death, giving me great distress as I watched the ebbing away of his brave little life. At the battle of Fredericksburg, Mahone's brigade, to which I was attached, occupied the extreme left of our line and suffered but little, as the heavy fighting was to the right and centre, but I was able to witness the charge of Meagher's Federal brigade against our line at the foot of Marye's Hill, which resulted so disastrously to those gallant fellows. Indeed, it may be said that there are but few instances during the war where American troops, either Confederate or Federal, were ever driven out of entrenched positions by direct assault. During the winter and early spring following this battle our brigade was doing outpost duty at the United States ford of the Rappahannock. The cold was trying to man and beast. The roads were execrable and transportation of supplies difficult and irregular, but we managed to exist, the ground hog and wild onions helping out the situation. Much has been said of the inadequate rations served the prisoners at Andersonville, but I feel quite sure that these men were as well and more regularly served than Lee's soldiers on many occasions, who could live on less, march farther, and fight longer without relief than any body of men that ever trod the earth.

When Hooker crossed the river on his way to Chancellorsville, Mahone's and Posey's brigades were the first to feel the sting of his metal. They opposed his advance as long as practicable. A short time after our men became engaged my friend Major

Stewart, of the 61st Va., was brought to the rear covered with blood. The breast pocket of his coat, containing his field glasses, had been torn away by a shot, and another had struck the cock of his army pistol carried in his right hand, and, splitting it into many pieces, had filled his hand and arm with slugs. These were extracted and he returned to the field. In a half hour he was brought back on a stretcher, with shock, his face and hair covered with blood, brains, and fragments of bone. He appeared to be mortally wounded, but upon washing him up, and picking the fragments of bone from his hair, I found no serious wound. A shell had struck a file of men immediately in front of him, killing two men and throwing their brains and the fractured fragments of skull into his face and knocking him down. He soon regained his composure, returning to his regiment, and served gallantly in almost every subsequent battle of the war without again receiving a scratch.

Lee's men in this battle attacking at every step with infantry and artillery the most intricate, well devised, and formidable earthworks and abatis of heavy timber, lost 13,000 men in killed and wounded, while Hooker lost 17,000 killed, wounded, and prisoners, 14 field guns, 20,000 muskets and 31,000 knapsacks. Three times the Confederates took these Federal lines, and three times they were driven out by Hooker's brave fighters. The pressure, however, was so continuous on their front and both flanks, and Lee's artillery so concentrated on his position, now crowded within the confined limits of the Chancellorsville field, that, Hooker himself being wounded, the field was yielded. His left under Sedgewick, who was to have attacked Lee's rear, was now soon disposed of, and the whole Federal army recrossed the river.

Now for some days, while the troops were resting from their herculean labors, the surgeons were the busiest of men, in operating, dressing, and gathering the wounded for transportation to the hospitals. Amputations were done when the wounded otherwise would not bear transportation. Our field hospitals were always selected with a view to a plentiful supply of clean running water.

Not to repeat any reference to the stages of our advance through Maryland and into Pennsylvania, I merely wish to refer to the circumstances of Stewart's crossing the Potomac and making a complete circuit of the Federal army and only rejoining Lee with the information he had gathered, and which Lee should have had earlier; only after A. P. Hill, whose corps, which was in advance, had injudiciously attacked and defeated, July 1, 1863, the advanced division of Meade's army, instead of waiting at Cashtown until the other corps of Lee's army were up and in supporting distance, as Lee had intended. The history of this great battle has been written up by competent men on both sides. Both armies were seriously crippled, but it may not be known among you that Lee felt himself strong enough to make another attack after Pickett's disastrous charge had been repulsed, having every field officer in his division either killed or wounded but one, but desisted when it was reported to him by his chief of ordnance that the artillery had expended almost the whole of their ammunition, and which was not replenished until the army returned to the neighborhood of Hagerstown, bringing away with them between five and six thousand Federal prisoners.

In order to have some conception of the magnitude of the labors performed in the field and hospital service by the medical corps of the Confederate army, Dr. Joseph Jones (from whose report I quote), a surgeon of acknowledged ability and who was detailed by the Confederate Surgeon-General, Dr. S. P. Moore, to investigate camp diseases and the native remedial resources of the South to supply a demand created by medicine having been declared contraband of war. His services in this respect were invaluable and the estimates made by him entirely trustworthy. Losses of the Confederate army 1861–1865: Confederate forces actively engaged in the war, 600,000; grand total of deaths from battles, wounds, and diseases, 200,000; losses from prisoners during the period, on account of policy of non-exchange of prisoners enforced by U. S., 200,000; losses from discharges for disability from wounds, diseases, and desertion, 100,000.

If this calculation be correct, one third of all the men actually

engaged in the Confederate service were either killed outright on the field or died of disease; another third of the entire number were captured and held prisoners of war for indefinite periods; and of the remaining third at least one-half were lost to the service by discharges and desertion. At the close of the war those fit for duty numbered scarcely 100,000 men.

Of this body of 600,000 men, 53,773 were killed, and 195,026 wounded on the battle field. One-third of the Confederate army was confided to the Confederate surgeons for treatment of battle wounds, and the greater portion, if not the entire body, of the 600,000 men were during the period of the war under the care of the medical department for treatment of diseases. To the surgeons of the medical corps is due the credit of maintaining this host of troops in the field. During the nineteen months from January, 1862, to July, 1863, 1,000,000 cases of wounds and diseases were entered upon the Confederate field reports and over 400,000 cases of wounds upon hospital reports. The number of such cases was greater during the following twenty-two months, ending April, 1865. It is safe to affirm that more than 3,000,000 cases of wounds and diseases were cared for by the medical corps of the Confederate States army from 1861 to 1865. It thus appears that each Confederate soldier was on an average disabled by wounds or sickness about six times during the war.

Such records demonstrate beyond dispute the grand triumphs and glory of medicine, proving the physician is the preserver and defender of armies during war.

"The Confederates held during the war 50,000 more prisoners than the Federals held of Confederate prisoners, yet 15,000 more Confederate prisoners died in Federal prisons than Federals died in Confederate prisons" (Wyeth).

"(The whole number of U. S. troops mustered into service during the war 1860–1865 was 2,789,893, or about three times as large as the entire fighting population of the Confederate States. At the time of surrender, and at the close of hostilities, the Federal forces numbered 1,000,516 officers and men, and equalled

in number the entire fighting population of the Confederate States.)"

The same authority estimates the number of surgeons and assistant surgeons, including those of the general hospitals, recruiting and conscript camps, at less than three thousand. No accurate estimate of the condition of the surviving soldiers who were disabled by wounds and disease during the war has been made Some of the Southern States have no records of their men, some have by law given limited pensions, and in several Confederate homes have been established for their reception, but on a moderate scale and maintained mostly by private subscriptions, with or without State aid.

These matchless soldiers accepted the issue in good faith; they returned to their homes, they resumed the avocations of peace, and engaged in building up the broken fortunes of family and country. They have discharged the obligations of good and peaceful citizens as well as they had performed the role of thorough soldiers on the battle field. It has been well said that no country ever produced braver or more intelligent and chivalrie soldiers, or more industrious, law-abiding and honorable citizens than were the soldiers who surrendered with the Confederate flag. The earth has never been watered by nobler or richer blood than that shed by those who fell beneath its folds.

The entire Confederate army was made up mostly of volunteers from every walk of life, and the surgical staff was composed of general practitioners from all parts of the Southern country, whose previous professional life, with some conspicious exceptions, furnished but little surgery, and gunshot wounds were seldom seen. The study of the hygiene of vast armies, hastily collected to repel invasion, poorly equipped, and scantily fed; the frightful experience of the wounded upon the battlefield and in the hospitals, presented a vast field for the exercise of the highest skill and loftiest patriotism of the medical men of the South. They responded to every call of their bleeding country and in all arms of the service labored for every soldier, however exalted or low his rank.

When her ports were blockaded, and medicines and surgical instruments and works were excluded as contraband of war, the medical practitioners of the South gave their lives and fortunes to their country without any prospect of military or political fame or preferment. They searched the fields and forests for remedies; they improvised their surgical instruments in many instances from the common implements of everyday life; they marched with the armies and watched by day and night in the trenches; they opposed their skill and untiring energies to the ravages of war and pestilence under all circumstances, during rain and sunshine, in the cold of winter or the burning heat of Summer. In the turmoil of battle, among the flight of bullets and shrieking of shells, the courageous hearts and strong arms of the Southern surgeons were employed for but one purpose, the preservation of the health and limbs of their countrymen. When the end came these officers returned to their desolate homes, resumed their practice, cheered and comforted their distressed countrymen, administered to the suffering, to the sick and wounded Confederate soldiers, and extended their noble and disinterested charities to the widows and orphans of their bereaved and distressed country. "These professional men looked forward to no political preferment by pleading their war records, but were content to serve their distressed comrades, asking and receiving no other reward than the 'peace which passeth all understanding,' which flows from the love of humanity, springing from a generous and undefiled heart." Among these many surgeons few indeed have been found to "crook the pregnant hinges of the knee where thrift may follow fawning."

We have seen how these Confederates returned to their desolate homes, for desolation reigned in almost every part of the Southern country ravaged by war, from the beautiful valley of Virginia, where Sheridan is reported to have said that the destruction had been so thorough, that a crow in flying over it would have to carry its own rations; how they had to contend not only with the cultivation of the soil, without means or proper implements, but with changes in the laboring masses, and condi-

tions requiring the greatest firmness and decision to master; how in forty years by their industry and energy they have enriched themselves and the whole country by their contributions to its wealth. If I have dwelt on the spirit of these departed Confederates it is because "*Quorum pars fui.*"

Excuse me for a moment longer for referring to a few statistics of practical value here. The South in 1905 had a population of 25,000,000. In 1880 the rest of the country had a population of 34,000,000. In 1905 the South's railroad mileage was 60,000, the mileage for the rest of the country in 1880 was 51,000. The South last year made 3,000,000 tons of pig iron, against 4,000,000 for all the rest of the country in 1880, mined 70,000,000 tons of coal against 36,000,000 for the rest of the country in 1880. It made 6,244,000 tons of coke against 3,000,000 for the rest of the country in 1880. It produced 42,495,000 barrels of oil against 26,000,000 for the rest in 1880. The South's capital invested in cotton mills in 1895 was $225,000,000, as against $200,000,000, for the rest in 1880. Its immense lumber products were $250,000,000, as against $191,000,000 for the rest of the country in 1880. Its annual farm products were $1,750,000,000, as against $1,500,000,000 for the rest of the country in 1880. These figures tell of a marvellous progress of development. The progress of the South in the last twenty years clearly indicates that in another quarter of a century it will produce and possess its full share of the nation's wealth. Indeed, I am beginning to fear that our people will become too zealous in the pursuit of material prosperity and fall short, in consequence, of the culture of the humanities, for which they were heretofore noted.

Some years ago I happened to read an article in a journal written by a Northern author of speculative propensities, and perhaps well known to some of your members, in which it was contended that the European races in America showed a tendency to deteriorate after a more or less prolonged residence; that it was necessary to have constant strengthening by the fresh influx of foreign blood in order to maintain their normal condition;

that in those sections in which such an influx of foreign blood failed to reach and enrich, this deterioration was more manifest and pronounced.

Now, gentlemen of the College of Physicians, after showing what has been accomplished by the people of the Southern States, both in war and peace, under what seemed almost insurmountable difficulties, a people among whom the Anglo-Saxon blood is less mixed than in any other part of our great country, and who have not received any marked influx of fresh European blood for nearly two hundred years to freshen and improve its stream owing to circumstances which we may not now be called to explain, is it not fair to attribute to that author an unscientific bias?

The same bias led Mr. Seward to believe that what he called the rebellion would be quelled in ninety days; or that led Emerson, who had been constrained by ill-health to spend a winter in Charleston, S. C. (a city always noted in the past for the hospitality and culture of its citizens), and who had been most cordially welcomed and entertained in a manner corresponding to his merits as a brilliant essayist and man of letters, to say upon his return to Boston, when asked his opinion of the Charlestonians, "that they were as polite as Frenchmen, but barbarians at heart."

Let us, then (and I make the appeal to the medical profession as one accustomed to scrutinize every proposition that appeals to them, and to weigh its merits with a scientific mind, avoiding any bias as leading to error and confusion), now that we are all parts of an indissoluble union, to respect one another at least for the good qualities possessed by the people of each section of our common country and banish forever those miserable prejudices which have led to so much trouble in the past.

FURTHER OBSERVATIONS ON SUPRAPUBIC PROSTATECTOMY.[1]

By JOHN B. DEAVER, M.D.

In making a further communication upon the operation of prostatectomy I desire particularly to report to the College that the last twenty-four consecutive operations have been done without a fatality; of these twenty-four operations, twenty-three were suprapubic and one infrapubic, or perineal. Taking the twenty-three suprapubic operations referred to in this communication and the twenty-three with three deaths, reported in my book on the *Prostrate*, gives a mortality of 6 per cent. for the last forty-six cases.

I will speak briefly of the conditions in the presence of an enlarged prostrate which cannot be relieved except by operation; of cystitis; of hemorrhage; of renal complications; of some points in the technique of the operation, which I regard highly important; of the ultimate results of the operation; and of the after-treatment. I will not discuss the frequency with which a prostatic should be catheterized, if this form of treatment is elected, but will emphasize the importance of knowing whether or not the amount of residual urine is increasing. It is in the class of cases where this is taking place, and neither the patient or physician is aware of it, that atony of the bladder occurs and becomes advanced until overflow from retention is present; or absolute retention, which means that the patient must for the rest of his life depend upon the catheter, not a pleasant existence, we will admit, I think.

Cystitis in enlargement of the prostate is almost exclusively the result of infection introduced through the passage of a sound

[1] Read June 6, 1906.

or catheter; this must be guarded against not only by observing strict asepsis in the instrumentation, but also by rendering the urine sterile, and in those patients susceptible to chills after this ordeal, by giving large doses of quinine before passing the catheter. When the cystitis does not yield to the usual treatment given for this condition removal of the enlarged gland must be seriously considered.

In the early stages of enlargement of the prostate, if no residual urine exists, there are usually no symptoms; here the passage of sounds in an attempt to prevent the growth of the prostate by pressure, will be more likely to cause a cystitis or inflammation of the prostate than to prevent the development of a postprostatic pouch. In chronic complete retention of urine, where the patient depends absolutely upon the catheter for emptying his bladder, being unable to expel a single drop of his own accord, the condition is almost always the result of absolute atony and can only surely be relieved by removal of the prostate. Chronic complete retention is almost always the result of chronic incomplete retention where the residual urine slowly accumulates and ultimately entirely overcomes the power of the bladder to contract and expel any urine. It may be due to the mechanical obstruction offered by the growing prostate, which prevents, even if the tone of the bladder be normal, any urine from being passed voluntarily. In exceptional cases it follows immediately upon acute retention, the bladder being then so very much distended that it never regains its contractility. Atony of the bladder is thus seen to be a more serious sequel of enlargement of the prostate than is retention of urine, as far as ultimate cure is concerned. In two of the twenty-three cases of suprapubic prostatectomy I refer to in this paper atony was present and entirely cleared up after the removal of the enlarged gland.

Hemorrhage from the bladder to the degree of making a serious complication in the presence of an enlarged prostate and in the absence of a stone I have met in but two cases. In one of these cases I removed the prostate and the hemorrhage immediately ceased and did not recur at any time during the convalescence,

which was not only uninterrupted but most smooth. When the patient first came under my notice he would lose as much as one-half pint of blood at one urination. He was confined to bed and the remedies usually used for intravesical bleeding given, in addition to ice pack to the abdomen. As long as the patient was kept absolutely quiet and not allowed to get out of bed, there would be but little bleeding, but when permitted to be active, or upon the passage of a catheter, the bleeding would again occur.

Hematuria occurring in a patient with an enlarged prostate must of course be thoroughly investigated to determine if possible its cause before either advising or resorting to any operation. Hemorrhage into the bladder becomes a complication of extreme gravity in cases of enlarged prostate, not only that it weakens the patient and causes anemia, but it causes cystitis, if it be not already present, as infection is practically sure to arise as soon as any amount of blood accumulates in the bladder.

Renal complications consequent upon an enlarged prostate can only be prevented by removal of the enlarged gland before infection of the bladder occurs. Hemorrhoids, prolapsus ani and pressure of the enlarged gland upon the rectum, to the degree of causing obstipation, can only be remedied by removal of the enlarged gland. Ulceration or fissure of the neck of the bladder causing constant and uncontrollable vesical tenesmus is occasionally seen; this is a very painful and wearing condition. When associated with an enlarged prostate removal of the gland is to be considered.

The points in the technique of the operation of suprapubic prostatectomy to which I wish to refer are the following: The incision I prefer for exposing the bladder is one carried through the right rectus muscle, the patient being in the high pelvic position. I believe this gives a stronger abdominal wall, when healing is complete, than when the operation is made in the linea alba. The bladder exposed, I try to avoid disturbing the prevesical fat as much as I can, as I am sure that the nearer this layer of fat is to being left intact, the less is the danger of urinary infiltration, with prevesical suppuration and sloughing. I have never had this to occur but once, in one of my earliest cases, since which time I

have avoided this complication. This was largely due I am sure to my care in dealing with this layer of fat. I should say, however, that in the patient in whom this complication did occur there was a very bad cystitis, which had existed for a long time, the patient having been a catheter subject.

The bladder having been opened, with the aid of narrow retractors, the prostate is fully exposed, when the steps of removal are quickly carried out. The opponents of the suprapubic operation have said that the operation is done in the dark; in answer to this I can say that such is not the case when it is properly done, in fact every step of the operation can be carried out under the direction of the eye. One or two incisions having been carried through the mucous membrane covering the prostate, depending upon whether one or both lateral lobes are enlarged, the sheath of the gland is scratched through with the finger-nail and the gland readily enucleated. In making the enucleation the dissection is made by clinging as it were to the true capsule of the gland, in this way lessening the chances of hemorrhage from tearing the prostatic plexus of veins. The gland having been removed, its bed is carefully inspected, when, if there is much bleeding, I grasp the margins of the opening through the mucous membrane and sheath (the latter, however, is not present in all cases upon the upper aspect of very large prostates) with long-toothed forceps, and pack the bed of the gland (the cavity made by the removal of the prostate) with gauze and carry one or two catgut sutures through the margins of the opening in the mucous membrane and sheath and the contained gauze, thus securing the gauze from being forced out, and bring the ends of the gauze through the lower angle of the wound in the abdominal wall. By doing thus under the eye there is no possible chance of obstrucing either orifice of the ureters. The gauze is removed in from five to ten days, and in some cases on the second day. I close the wound only at the upper angle so as to prevent any chance of protrusion of the prevesical fold of peritoneum. In addition to the suture which apposes the upper angle of the wound one is carried through the abdominal walls, walls of the bladder, and the drainage tube;

this is done with the object of lessening the chances of urinary infiltration, and by gravity it aids in keeping the urine in the bas-fond of the bladder. The drainage tube consists of soft rubber and should be as much as an inch in diameter, having two openings made upon either side at the extremity which is engaged in the bladder. The tube should simply be passed so the openings clear the bladder wall, and not deep down into the bas-fond; this gives excellent drainage, and in the majority of instances prevents an excess of leakage. These constitute the chief points to be observed in the technique, the other steps of the operation being too familiar to call for further description. In one of the reviews of my book, the reviewer called attention to my method of packing for hemorrhage as being uncalled for, but nevertheless, I regard it paramount in some cases and propose to continue to use it until I can find some better way of controlling bleeding, for which I am sure the gentleman referred to, if he operates at all, trusts largely to Providence. There is no doubt in my mind that a percentage of fatal cases following prostatectomy is due to persistent oozing, notwithstanding that the margins of the bed of the prostate have been brought in contact by finger pressure and that the hot douche has been thoroughly used.

The large drainage tube is removed usually in thirty-six hours —sometimes I allow it to remain longer. The bladder is kept perfectly clean where there is a cystitis, which is usually the case, by douching with warm boracic acid solution introduced through the suprapubic opening. In some cases only the douche introduced through the urethra will wash debris from the base of the bladder. The convalescence is as a rule satisfactory and the ultimate results excellent.

The most important part of the after-treatment of cases of suprapubic prostatectomy is the nursing, which should be at the hands of one who has had experience with these cases. I know of no other class of cases where an experienced, kind, faithful and trustworthy nurse can do more for the comfort of the patient. These patients require a great deal of attention, in fact, almost constant care, which, if they receive, their convalescence is

materially hastened. The bladder must be kept clean by flushing with warm boracic acid solution once or twice daily or oftener if the occasion calls for it. The patient's nourishment for the first week should be simple but nutritious. It is my practice to first allow albumen water and Celestine vichy, then milk and Celestine vichy and table water as much as the patient cares to drink, providing the stomach accepts it kindly. These patients usually make an uninterrupted recovery. We are always more or less concerned about the quantity of urine the patient passes, which cannot be definitely determined for the first few days, as there is a certain amount of leakage around the drainage tube. If there is any question as to the patient's not passing the full amount of urine, time should not be lost in giving salt solution by the bowel and if need be, hypodermoclysis, and if the stomach is retentive. caffeine, spartein, and calomel by the mouth. When there is persistent nausea, I regard lavage as superior to medication. Any other symptoms occurring during convalescence are to be met on general principles.

After the patient has entirely recovered and resumes his normal life I advise the passage of a steel sound, not the full caliber of the urethra, however, two or three times a year, in this way lessening any chance of contraction of the canal.

A CLINICAL STUDY OF GASTROPTOSIS, WITH SPECIAL REFERENCE TO THE VALUE OF THE BISMUTH SKIAGRAPH SHADOW IN DETERMINING THE TOPOGRAPHY OF THE GASTROINTESTINAL TRACT.[1]

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The following report is based upon the study of forty cases presenting gastric or gastrointestinal symptoms. This work is reported from the clinic for diseases of the stomach and intestines at the Polyclinic Hospital, service of Dr. Sailer. The cases were taken from various sources. Thirteen were private cases of Dr. Sailer's, ten of Dr. Musser's, two of the writer's, five from Dr. Sailer's clinic at the Polyclinic Hospital, nine from the wards of the University Hospital, and one from the writer's clinic at the Presbyterian Hospital. In the study of these cases particular stress has been laid upon outlining the stomach and in obtaining its size, shape, and position. To do this the following methods were used: Inspection, percussion, auscultatory percussion, auscultation with the tuning-fork, inflation with carbonic acid gas or air, illumination by the electrodiaphane with the aid of fluorescent solutions, and the use of skiagraphs.

After the ordinary methods of physical examination had been employed *x*-ray pictures were taken in each case by Dr. Henry K. Pancoast. The technique used in taking the pictures was as follows: Bismuth subnitrate held in suspension in mucilage of acacia was either poured into the stomach through the stomach

[1] Read June 6, 1906.

tube or was swallowed by the patient; the latter method was principally used. The bulk of the bismuth acacia mixture varied from six to thirty-two ounces; the amount of bismuth varied from one to four ounces. Immediately after the bismuth had reached the stomach the pictures were taken, the patient being in the standing position, and the plate in contact with the anterior abdominal wall. The *x*-rays were thrown posteriorly, the patient holding the breath during full inspiration for an exposure of eight to fifteen seconds. The exposures were made with the breath held, thus eliminating blurring by respiratory and peristaltic movements. After the picture has been taken it is advisable to siphon the bismuth mixture out of the stomach. In several cases as much as four ounces of bismuth was left in the stomach, with no unpleasant symptoms; but on the other hand six cases showed toxic symptoms after this amount had been left in. For the purpose of obtaining the lower border and segment of the stomach six ounces of the emulsion containing one ounce of bismuth is sufficient. This amount has been left in the stomach, with no bad effects.

Comparison of the Results Obtained by Skiagraphs with Results Obtained by Other Methods.

Examination shows that by this method the stomach and intestines can be studied more completely and more accurately than has heretofore been possible. In some cases skiagraphs have shown marked prolapse which repeated physical examinations failed to indicate. The difficulties encountered in inflation, illumination, etc., that is, the confusion between the tympanitic note over the stomach and that over the colon, the tendency in distending a stomach with gas or air to push before it a distended colon, making the distinction between the two less marked, also the difficulties presented by the fact that the undistended stomach is not in contact with the abdominal wall and when empty is contracted high up under the diaphragm and almost inaccessible to physical examination, are not met with in examinations by skiagraphs. The conditions under which skiagraphs are taken

are approximately constant, the bulk and weight of the stomach contents and the distention of the stomach being known. The results from skiagraphs are not only more accurate, but are by far more exhaustive in the information obtained.

The œsophagus can be studied for stricture, dilatation, or saeculation; the cardia for stricture, and the size, shape, position, and the smoothness of its wall determined.

A complete study of the body of the stomach can be made, and of great importance is the clearness with which the upper curvature and the pylorus is shown in the skiagraphs. Regularity of the stomach wall can be observed and variations from the normal noted. In Case 7 it was possible to diagnose a tumor invading the stomach wall by the irregularities of the lower border.

The knowledge obtained of the shape of the stomach and the position of the pylorus are two important points made possible by skiagraphs. The establishment of these points by ordinary methods of examination is uncertain and often impossible. Mechanical difficulties in stomach drainage can be recognized, especially in cases of prolapsus, when the stomach bends sharply on itself.

In the examination of the skiagraphs of forty cases the following points were particularly noted: The size, shape, and position of the stomach, the position of the pylorus, and the position and size of the colon.

Case.	Gastroptosis.	Dilatation.	Low pylorus.	Kinking.	Prolapse of colon.
1	+	+	+	0	×
2	+	+	+	0	×
3	+	+	+	0	+
4	+	0	0	+	×
5	+	+	+	+	×
6	+	+	+	+	×
7	0	+	0	0	×
8	0	0	0	0	×
9	+	+	+	0	+
10	+	+	+	+	×
11	+	+	+	+	×
12	+	+	+	0	×
13	+	+	+	0	×
14	+	0	0	0	+
15	+	+	+	0	+
16	+	+	+	0	×
17	+	+	+	0	×
18	+	+	+	0	×
19	+	0	+	0	×
20	+	+	+	+	×
21	+	+	+	+	×
22	+	+	+	0	×
23	+	+	+	0	×
24	+	+	+	+	×
25	+	+	+	+	×
26	+	+	+	0	×
27	+	+	+	+	×
28	0	0	0	0	+
29	+	+	+	+	×
30	+	+	+	+	×
31	+	+	+	+	×
32	+	+	+	0	×
33	+	+	+	+	×
34	+	+	0	+	+
35	0	0	0	0	+
36	0	0	0	0	0
37	+	+	0	0	×
38	0	+	0	0	+
39	0	0	0	0	×
40	0	0	0	0	×

× = colon not examined.

Gastroptosis. Analyzing the results of skiagraphs of these forty cases, the first significant fact is that thirty-one show the presence of gastroptosis.

In some of these cases gastroptosis was suspected before skiagraphs were taken, by the presence of such symptoms as a relaxed abdomen, with separation of the recti muscles, or by the results of inflation, the use of the gastrodiaphane and the ordinary methods of physical examination. On the other hand, skiagraphs showed

the presence of prolapse of the stomach in cases in which repeated physical examinations failed to indicate it. Schüle confirms this statement (*Archiv f. Verdauungs. Krank.*, December, 1905, xi. p. 509). The subjective symptoms often threw but little light upon the presence of prolapse and were often entirely at variance with the findings. The subjective symptoms found were, in general, symptoms of impaired motility, of failing nutrition and nervous disorders, and they seldom corresponded to conditions made evident by the skiagraphs. One extreme case of prolapse presented no gastric symptoms whatever, and the skiagraph was taken as a matter of interest on account of a wide diastasis of the recti. The strength of the gastric musculature, the favorable shape of the stomach and the position of the pylorus evidently accounted for the compensation in this case.

In the most extreme case (19) of prolapse, the stomach extending to the pelvis, with the exception of loss of appetite, no gastric or intestinal symptoms were present. Failing nutrition and intense nervous symptoms led to the *x*-rays examination, physical examination having failed to show the true position of the stomach. At present writing gastric symptoms are coming on rapidly, fermentative emesis and retention making sufficient feeding impossible, and operation has been advised.

The degree of ptosis varied from cases in which the lower border of the stomach reached the umbilicus to cases in which the descent of the body of the stomach was complete.

The value of the knowledge of the position of the stomach is greatly augmented by the exact information as to its size and shape and as to the position of the pylorus; it is in ascertaining these points that the value of the skiagraphs is most evident.

Dilatation. In twenty-nine of the forty cases examined some degree of dilatation was seen. In two cases dilatation was found with no prolapse and in only two cases was prolapse found without some degree of dilatation. The conditions which relax the gastric attachments would seem to relax the gastric wall also.

The first eight to nine inches of the duodenum are firmly attached to the spine (see discussion by Davis), and the cardia is also a

fixed point. The stretching of the gastrohepatic ligament allows the stomach to drop from these more or less fixed points, and the weakening and stretching of the gastric wall would seem to follow prolapse.

Shape of the Stomach. The shape of the stomach from a study of skiagraphs is shown to be most variable. It varies from a pear-shaped organ lying in a partly horizontal axis to a long stretched-out cylindrical organ lying almost in the perpendicular, with a pouch-like formation at the lowest point or to a J-shaped organ, with the upper extremity at the cardia and the lower extremity at the pylorus, its general axis being vertical. It is believed that the shape of the organ is skiagraphed under natural conditions, since the weight and bulk of the bismuth mixture are not more than that of the ordinary meal. A patient assumes a natural position, *i.e.*, standing, and is free from the effect of tight clothing. Although pictures are taken during full inspiration it is not forced inspiration, and it is not believed that the full inspiration affects the position of the stomach to any appreciable extent. Holznecht and Brauner, in a recent article, in watching the stomach by the fluoroscope, claim that the stomach moves downward four fingers' breadth and changes in shape during forced inspiration. Dr. Pancoast took two pictures of the same case, one during forced inspiration and one during forced expiration, and found the difference in the position of the stomach of but little moment, the actual difference being about three-sixteenths of an inch and with but slight change in shape. In the study of the shapes of these stomachs one point seems of particular significance. The cases of gastroptosis show sometimes a low position of the body of the stomach and an acute angle as the stomach sharply bends to reach the higher pylorus; this forms what I shall term as kinking in the pars pylorici; this is particularly noticeable in the perpendicular tubular stomach. The stomach can also be seen bending *on itself* so sharply that it is difficult to distinguish the two sections of the stomach. (See Plates I, II, and III.) This shape of the stomach seems to have an important bearing on the condition of motility, and may explain why in some cases of marked prolapse

PLATE I.—Shows gastroptosis, dilatation, sacculation, and kinking of the pyloric part of the stomach.
PLATE II.—Shows cylindrical shape of the body of the stomach, marked kinking of the pyloric region.

motility remains fairly good, while in others of less ptosis, but with this angular distortion, motility is so much embarrassed. Of the forty cases reported fifteen showed the presence of kinking in the pyloric region; to bring this out it is advisable to use one quart of the bismuth emulsion, for by using this quantity the upper curvature and the pylorus are shown very clearly.

Position of the Pylorus. The pylorus in the great majority of cases lies to the right of the median line; in five cases it was found on the left of the median line. This was most marked in the cases of the tubular shaped stomach lying almost in the perpendicular; the pylorus in general was found prolapsed. This was shown only by the *x*-ray pictures, as illumination and inflation gave very satisfactory results in locating this point; by using the larger amount of bismuth the pylorus can be accurately located, the contour, direction, and smoothness of its walls noted. Of the thirty-two cases showing gastroptosis twenty-eight showed a low pylorus; in most of these cases it occupied a position just to the right and below the level of the umbilicus.

Prolapse of the Colon. This condition has been found difficult to diagnose without the aid of the radiograph; of nine cases in which the colon was examined by this means eight showed prolapse. To picture the colon the method is used which was reported by the writer to the Section on General Medicine of the College of Physicians of Philadelphia in April, 1904; two ounces of bismuth in eight ounces of milk or acacia is injected into the rectum after the intestine has been thoroughly emptied. Exposures were made fifteen to forty-five minutes after the introduction of the bismuth. These pictures are of interest as showing the rapidity of anti-peristalsis, which must account for the ascent of the bismuth mixture as far as the ileocecal valve in fifteen minutes. In two cases examined for stricture the ascent of the bismuth stopped at the point of obstruction and was of diagnostic value in locating the lesion. By giving bismuth by mouth and at the same time introducing it by rectum, satisfactory evidence can be obtained of the relative position of the stomach and colon as well as their respective size and shape. To show the small intestine, pictures

taken twelve to fifteen hours after the bismuth is given by mouth would be of use in locating stricture or obstruction. The cecum is always found filled; the transverse colon can easily be seen and is seldom found placed horizontally; it passes from right to left in an upward direction in a curve, with the convexity downward; the splenic flexure usually is high up close to the diaphragm; in one case it was found deep in the pelvis. The splenic flexure frequently forms an acute angle and may be doubled on itself; the hepatic flexure is found usually lower than the splenic flexure; this also often forms an acute angle and is doubled on itself. Gas collections are usually seen at both flexures. The chief points to be noted in the study of the intestines are the low position of the hepatic flexure and the high position of the splenic flexure; the acute angles at these flexures, and the fact that intestinal contents seem to remain longer in the cecum than at any other point.

Some Results in the Treatment of Gastroptosis. The treatment in general has consisted in hygiene, diet, drugs, lavage, electricity, rest, massage, abdominal belts, and operation. In the extreme cases of gastroptosis to secure proper drainage abdominal support or surgical treatment is necessary. The results from the use of belts or abdominal supports have been in some cases gratifying; eight cases have shown marked relief from symptoms by this means. In Case 5, extreme prolapse, with dilatation, low pylorus, and kinking at the pyloric portion, an abdominal support of adhesive plaster consisting of long strips of plaster passing from below the stomach in a curved line upward and outward, passing across the abdomen and posterior thorax to a point between the scapulæ, overlapping each other on each side respectively, relieved the symptoms of poor motility.

A picture taken with this support on shows the stomach little if any elevated; the support evidently has altered the shape of the stomach enough to allow better drainage from the pylorus. Five cases have been operated upon; three have had gastro-enterostomy performed, one gastrofixation, and one gastrofixation and colonfixation. Case 22 appeared at my clinic at the Presbyterian Hospital, May 15, 1905; has been practically incapacitated for

PLATE III.—Shows gastroptosis, dilatation, and kinking of the pyloric part of the stomach.

PLATE IV.—Shows the outline of the stomach in connection with ptosis of the transverse colon, high position of the splenic flexure and adhesions between the transverse and descending colon.

ten years. Chief symptoms: pain, pyrosis, nausea, vomiting, flatulence, constipation, headache, and extreme nervousness. The stomach was found so prolapsed that she was sent to the Woman's Medical Ward under Dr. Stryker and Dr. Hughes, and later to Dr. Willard. Operation of gastrofixation was performed by Dr. E. B. Hodge, in October, 1905, in the service of Dr. Willard; shortening of the gastrohepatic ligament, with the addition of a fold taken in the anterior wall of the stomach, was performed. The result in this case has been a relief of symptoms and gain of thirty pounds; the patient is now upon a liberal diet.

Some Cases in Which Skiagraphs were of Service in Making the Diagnosis, Often when the Diagnosis was Impossible by Other Means of Physical Diagnosis.

Miss M. H. (case of writer's), aged twenty-two years; family history negative; personal history negative, with exception of typhoid fever nine years ago. Has had stomach trouble for fourteen years. Chief symptoms have been fulness and distress after eating, constipation, headache, nervousness, acne, appetite poor and irregular.

Test-meal, Ewald, t. a. 60. Free HCl, 20. Much mucus present. Retention.

Skiagraph showed some degree of gastroptosis.

An abdominal belt was applied, which has greatly benefited gastric motility. Persistent lavage is gradually reducing the great quantities of mucus secreted.

Miss L. B. S. (case of Dr. Sailer's), aged twenty-seven years, nurse. Attacks of nausea, distention of the abdomen, at rare intervals vomiting, chronic constipation, pain after eating, pain through abdomen coming on immediately to one hour after meals, sour eructations, intestinal mucus. Test-meal, total acidity, 44. The liver extends two inches below costal border, right kidney is palpable, gastric tympany, sixth rib to one-half inch above umbilicus and from median line to the anterior axillary line. Tuning-fork gives some outlines, tenth rib attached, no separation

of recti, left kidney not palpable, on deep inspiration spleen extends to one inch of the costal border, peristalsis diminished. Skiagraph showed marked gastroptosis. Abdominal support gave great relief.

J. E. S. (case from the Stomach Clinic at the Polyclinic Hospital), single, aged twenty-four years. Began at the age of sixteen years to have heartburn, water-brash, vomiting, eructations, soreness in epigastrium. At present appetite is good, regurgitation of food, pyrosis, pain, constipation, drowsiness after meals, bad taste in the mouth, fulness, and distress. Test-meal, Ewald, fifty minutes, t. a. 66, free acid 18, retention; second test-meal, Ewald, one hour, t. a. 60, free acid 30. Stomach inflated and diaphane used. Diagnosis was not complete without the aid of a skiagraph, which showed marked degree of gastroptosis.

Miss M. L. (case from the Stomach Clinic at the Polyclinic Hospital), aged fifty-one years, milliner, attacks of indigestion lasting for weeks at a time; these attacks started while in India upon a very irregular diet, costive, appetite irregular, eructations, pyrosis, pain, thirst abnormal, fulness and distress after meals, headache. Skiagraph showed marked degree of gastroptosis. Very much improved by belt.

Mrs. Y. K. (case from the Stomach Clinic at Polyclinic Hospital), aged twenty-eight years, housewife. For the past ten months continued pain in epigastrium, worse after eating, appetite good but has sitophobia, difficulty in swallowing, nausea, pyrosis, constipation, pasty taste in mouth, fulness and distress marked, headache, palpitation, inflation with carbonic gas and air shows gastroptosis, fine peristaltic wave is seen when the stomach is inflated, passes from left to right. Skiagraph showed marked degree of gastroptosis. Abdominal belt gave some relief. Operation advised.

S. R. (case from the Stomach Clinic at the Polyclinic Hospital), aged forty years, married, white. Began one and a half years ago with pain in the stomach; was treated at the Pennsylvania Hospital for vomiting and pain in epigastrium, and an exploratory operation was performed. Progressive loss of weight, vomiting,

pain and heaviness in the stomach, bowel movements from five to six daily, no appetite, very weak, present weight 116, former weight 160; test-meal, egg albumen, white of one egg in a pint of water, forty-five minutes, t. a. 26, free acid 14. Numerous test-meals were given showing a general subacidity with much mucus; *x*-ray picture shows the stomach in position with the colon "M" shaped. (See Plate V.) One year after treatment: test-meal, Ewald, one hour, t. a. 36, free acid 26, weight 117; hemoglobin, 80 per cent.; red blood corpuscles, 3,900,000; white blood corpuscles, 6000; stomach was frequently dilated with carbonic gas; the gastrodiaphane was frequently used. An operation for inguinal hernia was performed at the University Hospital, since which time patient has gained eighteen pounds.

Miss M. H. (case of Dr. Sailer's), aged fifty years, school-teacher, family history negative; past history: delicate, slender, never strong but energetic; three years ago became excited and had sense of something giving way in abdomen; has never recovered health since; at varying intervals after meals has oppression and distention, which is relieved by eructations of flatus or vomiting, the quantity vomited varying from a pint to one quart; the vomitus is bitter and sour; constipated; no localized pain; average weight 115, at present 96. Physical examination: Tenth rib is not attached, separation of recti, upper liver dulness at sixth rib, stomach tympany starts at sixth rib, the lower border of the liver extends to the level of the umbilicus, the right border as far as the parasternal line, the lower border of the right kidney extends to the level of the umbilicus, left kidney and spleen not palpable; a nodule is felt an inch and a half from the anterior superior spine of the ilium in a line between the umbilicus and the right anterior superior spine; the outline of the stomach can be seen; greater curvature being an inch and a half above the symphysis pubis, lesser curvature apparently at the level of the umbilicus extends to the right two inches to the right of the median line; loud splashing, tuning-fork confirms percussion; there is apparent obstruction at the pylorus, pressure upon the stomach at first causes no sound and then a sudden gushing; distinct peristaltic contractions in the

gastric area may be seen passing from left to right and from above downward; the gastrodiaphane was used with a fluorescent solution; the light showed very clearly through the abdominal wall and followed a line from the anterior superior spine to the symphysis on both sides; the position of the lesser curvature could not be determined. Skiagraph confirms diagnosis of gastroptosis.

C. M. F. (case of Dr. Sailer's), aged forty-five years, family history negative, except family is prone to weak stomachs. Past history: appendicitis at thirty-three, cystitis at forty-one, alcohol to excess up to one year ago, tobacco, five to six strong cigars a day, began to have stomach trouble some years ago, for the past four or five years has had diarrhœa after eating, was obliged to live on kumiss, food caused sour eructations, stools contain masses of undigested food, little nausea, voluntary vomiting, costive, soreness in epigastrium, especially after exposure to cold. Test-meal, Ewald, fifty-five minutes, much mucus, t. a. 83, free acid 47; second test-meal, sixty minutes, t. a. 84, free acid 40; given lavage with protargol. Skiagraph showed gastroptosis and dilatation.

Mrs. J. W. F. (case of Dr. Sailer's), past history: Past nine months has had indigestion at varying periods, a few minutes to four or five hours after eating there is discomfort, relieved by vomiting; vomit sour, "sets teeth on edge;" no pain in abdomen, increasing nausea relieved by vomiting; dull, diffuse headache; insomnia, constipation; blood hemoglobin, 75 per cent.; red blood corpuscles, 4,770,000. Test-meal, Ewald, t. a. 70; test-meal, Fisher, t. a. 130; liver at the sixth rib, lower border, not palpable; kidneys not palpable, peristalsis active, tenderness over epigastrium. Skiagraph shows gastroptosis of marked degree. (See Plate III.) Abdominal belt gave great relief.

Miss M. C. (case of Dr. J. H. W. Rhein). Two years ago pain behind the sternum associated with hiccough, costive, difficulty in swallowing, nausea when eating, vomits during mealtime, very sour acid eructations, discomfort in abdomen, appetite poor, both tenth ribs unattached, no separation of recti, kidneys and spleen not palpable; no tympany over gastric region, intragastric pressure very high. With the diaphane the light is seen

PLATE V.—Shows prolapse of the transverse colon.

PLATE VI.—Shows ptosis of the sigmoid.

at the umbilicus. Skiagraph showed marked gastroptosis. This patient was operated upon and gastroenterostomy performed by Dr. B. C. Hirst, with good result.

Dr. M. (case of Dr. Sailer's), aged fifty-three years, neuropathic hereditary; for the past twenty years has had stomach trouble; started with pain in the epigastrium, usually some time after eating; dull worrying pain lasting an hour or more, at present almost continually; immediately after eating there is oppressive pain and weakness lasting for hours, distinct increase about two hours after eating; no nausea or vomiting, costive, appetite is poor, no headache, insomnia due to pain; the diaphane shows a light just below and just to the right of the umbilicus; the liver at the level of the umbilicus, gastric tympany sixth rib posterior axillary line to one inch below costal border; test-meal, Ewald, one hour, t. a. 64, mucus, free acid present. Operation was advised as the skiagraph showed extreme degree of gastroptosis and dilatation.

Mr. M. W. C. (case of Dr. Sailer's), aged thirty-three years, teacher, single; insomnia, poor appetite, costive, pain in epigastrium, eructations three hours after eating relieved by hot drinks, abdomen tender, nausea, no vomiting; pain after eating is relieved by out-door life and work, made worse by anxiety, worry, fatigue; gastric tympany, seventh rib in midclavicular line descending as far as the umbilicus, slight separation of recti; test-meal, Ewald, fifty minutes, t. a. 40, mucus present; hemoglobin, 70 per cent.; red blood corpuscles, 5,500,000. Skiagraph showed marked degree of gastroptosis.

Mrs. C. B. (case of writer's), aged twenty-eight years; family history neurotic; personal history: has one child aged three years; has always been extremely nervous. Absence of appetite, loss of weight, vomiting, melancholia. Skiagraph showed the lower border of the stomach reached as far down as the pelvis and that the body of the stomach was kinked. Dr. Beyea operated July 17, 1906, replacing the stomach and relieving the kinking by shortening the gastrohepatic ligament. At the present writing she is making a good recovery.

Holzknecht and Brauner (*Wien. klin. Rundschau*, 1905, xix.)

consider the fluoroscope of more service than the radiograph; by the fluoroscope they can test palpatory and respiratory motility of the stomach. They state that on deep inspiration the stomach moves downward four fingers' breadth and changes in shape, becoming longer and narrower. They give 10 grams of bismuth in 50 grams of water and note the deepest part of the stomach; they note also the influence of deep massage in pressing the stomach down and also the influence of respiratory movements. They consider this method of great value in diagnosis of carcinoma and hour-glass stomach as well as dilatation and gastroptosis.

Hulst (*The Physician and Surgeon*, September, 1905) goes farther than other investigators in the technique of exposures, eliminating blurring caused by respiration and peristalsis. He reports twenty-two cases. He used bismuth nitrate suspended in one quart of milk and taken slowly, with or without bread. He takes one skiagraph immediately after eating; he takes a second skiagraph six hours after the bismuth meal, allowing no food in the meantime; he takes a third skiagraph twelve to fourteen hours after the meal, as the best time for pictures of the colon. He has not used bismuth enemata because he has had satisfactory results by giving the bismuth by the mouth.

Hulst's *x*-ray pictures show the stomach and colon differently from descriptions in the majority of text-books. The current conception of the size, shape, and position of the normal stomach must be modified; to get a correct idea of displacement the pictures must be taken standing; the first skiagraph shows the size, shape, and position of the stomach, the second shows the motility of the stomach, and the third shows the position, size, and shape of the stomach.

Pfahler (*Archiv. of Phys. Ther.*, July, 1905) used one ounce of bismuth in twenty ounces of milk. He regards this method as one which is accurate, which gives permanent records, and is of no danger, causes no pain or inconvenience to the patient. He takes pictures in the prone position and standing, immediately after the bismuth has been given, then at intervals of six, twelve, and forty-eight hours.

Rieder (*Fort. auf. dem. Gebeit. der Roentgenstr.*, February, 1905) says that all other methods of outlining the stomach are replaced by the radiograph. He says that an *x*-ray picture of the empty stomach is deceptive on account of the contractility of the stomach. He disapproves of inflating with carbonic gas on account of danger to the patient. In his series of radiographs the pylorus is easily seen; the duodenum is not easily seen, as it is covered by the liver and stomach. The jejunum in its upper part is not clearly seen, the lower part together with the ileum can be easily discovered. The small intestine is less readily seen on account of active peristalsis, the chyme is more diluted, the walls are smoother and prevent the bismuth chyme from settling there. The termination of the small intestine at the cecum can be seen, also the valve; the large intestine can be recognized by the plicæ semilunares; the termination of the cecum into the ascending colon can be recognized, The hepatic flexure, the transverse colon, the splenic flexure, and the descending colon can easily be seen. Still better results can be obtained from the use of bismuth enemata; he says that bismuth does not show gastric motility, but does show intestinal motility. Chyme stays longest in the cecum and the ascending colon. These portions of the intestine may be full while other portions are empty. He states that this may have some bearing upon the causation of appendicitis.

Tousey (*New York Med. Journ.*, May 21, 1904) prefers fluoroscopic work. He also uses radioactive and fluorescent solutions as an assistance in *x*-ray work.

Dalton and Reid (*Lancet*, April 1, 1905) obtain the position of the stomach by the *x*-rays by using an œsophageal tube filled with bismuth. They use both the fluoroscope and radiograph. They state in conclusion that this method certainly enables a physician to recommend an operation with the greatest confidence.

Schule (*Archiv. f. Verdauungs Krank.*, December, 1905) compares the accuracy of mapping out the stomach by percussion, inflation, etc., to the results obtained by use of *x*-rays. He considers the latter method of the greatest value and enumerates the sources of error which are avoided by this method. He refers par-

ticularly to the confusion caused by the transverse colon when it lies in front of the stomach.

When the stomach is artificially distended the transverse colon is pushed ahead of it against the abdominal wall, making it almost impossible to distinguish the two by the ordinary methods.

Rieder (*Münch. med. Woch.*, 1906, iii) gives extensive results in the use of the fluoroscope by watching the course of bismuth throughout the course of the digestive tract. His pictures illustrate also the motor function of stomach and intestines. The pylorus is noticed to be the motor orifice of the stomach; it opens and shuts rhythmically, stopping when the small intestine becomes filled up; thus is prevented too great filling. Bismuth subnitrate neither increases nor decreases the activity of the stomach, and its digestive power can thus be readily determined. The fluoroscope shows that the stomach contents diminish gradually; fluids are emptied quicker than solids, and large quantities incite greater motility than small quantities; the stomach works quickest at the beginning of digestion. A small amount of food stays in the deepest part of the stomach a long time.

Conclusions. *x*-ray pictures of the stomach and intestines for diagnostic purposes excel by far any other method. To the surgeon, skiagraphs of these organs are of the greatest value and operations upon the digestive tract for prolapse, etc., can be undertaken with far more confidence. The permanency of the record secured by skiagraphs and the accurate manner by which the position of the stomach and intestines can be ascertained before, during, and after treatment add to the value of the method.

Skiagraphs have proved of value in the diagnosis of stricture, dilatation, and sacculation of the œsophagus; of dilatation, prolapse, hour-glass stomach, and cancer of the stomach; of stricture, dilatation, and tumors of the intestine; of prolapse of the colon and sigmoid.

In addition to the accuracy of the results obtained the simplicity of the technique, provided a good *x*-ray apparatus is accessible, and the comparative comfort to the patient are to be mentioned; the inconvenience being no more than that caused by the passage

of the stomach tube. Siphoning the bismuth mixture from the stomach excludes the element of danger to the patient, a distinct advantage over inflation.

The present work was begun two and a half years ago, and the present method used is the result of gradual development.

It was begun by taking a series of pictures of the intestine, which was reported to the Medical Section of the College of Physicians in April, 1904. It followed the line of work suggested by Cannon in his work upon guinea-pigs, mice, and dogs. The work has been done in connection with my service at the Polyclinic Hospital, in the clinic for diseases of the stomach and intestines, in the service of Dr. Sailer, and I wish to acknowledge his kind co-operation and assistance, and also to thank Dr. H. K. Pancoast for his skilful work in the *x*-ray laboratory of the University of Pennsylvania.

BIBLIOGRAPHY.

Rieder. Münch. med. Woch., August 30, 1904.
Cannon. Journ. Amer. Med. Assoc., March 21, 1903.
Hulst. Physician and Surgeon, September, 1905.
Newman. Wien. klin. Woch., Nov. 24, 1904.
Steele and Francine. Journ. Amer. Med. Assoc., November 8, 1902.
Gallant. Internat. Clinics, vol. iv, fourteenth series.
Holznecht and Brauner. Wien. klin. Rundschau, xix, 1905.
Pfahler. Archiv. of Phys. Ther., July, 1905.
Dalton and Reid. Lancet, April 1, 1905.
Tousey. N. Y. Med. Journ., May 21, 1904.
Schüle. Archiv. f. Verdauungs K. rank., Berlin, December 8, 1905, xi, p. 509.
Williams. The Roentgen Rays in Medicine and Surgery.
Hulst. Archiv. of Phys. Ther., January, 1906.
Einhorn. Archiv. of Phys. Ther., September, 1905.
Konried. Le Progrès Médicale, Paris, 1906, vol. xxii, p. 113.
Dalton and Reid. Trans. Clin. Soc. London, 1905, xxxviii, p. 122.
Holzknecht. Berlin klin. Woch., 1906, xliii, p. 127.
Brauner. Archiv. f. Phys. Med. u. Med. Tech., Leipzig, 1905, i, p. 11.
Leven and Barret. Presse Médicale, September 16, 1905.
Steyver-Yesell. Charitè, I. Erste, Berlin, November 2, 1905.

DISCUSSION.

Dr. Joseph Sailer: Since Glenard first called attention to the displacement of abdominal viscera, and suggested that it was a possible physical basis for the condition called neurasthenia, the subject has been studied with more or less interest, curiously enough, not always by the medical profession as a whole, but certain individuals have been impressed by the importance of this condition, often paying attention only to the displacement of a single organ, as for example, the interest that was excited by the ptosis of the kidney a few years ago.

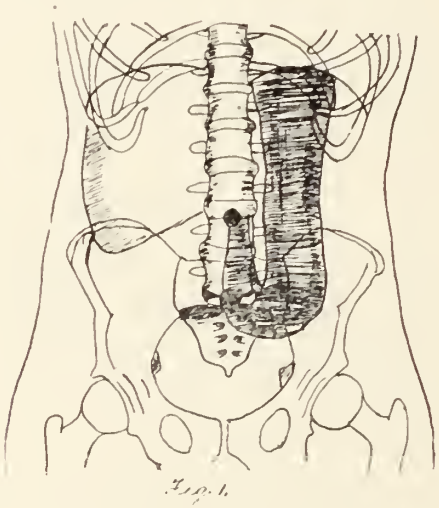

Fig. 1.—Gastroptosis, tubular shape, with dilatation, low position of the pylorus, and pyloric "kink."

The diagnosis of gastroptosis is by no means easy. I say this from what I believe is a reasonably full experience. There is not a method upon which we can with certainly rely if it be not the *x*-rays. Percussion, inflation, the gastrodiaphane have all led me into error, although I believe that the repeated employment of inflation with the tube is a reasonably certain procedure. This, however, is not altogether a method agreeable to the patient, often indeed it is associated with actual discomfort—and it gives information only regarding the lowest point and the furthest point to the right.

The gastrodiaphane, when it works, is almost ideal. The bright point of light following the greater curvature and slipping into the pyloric end of the stomach, where it stops, is so clear and characteristic that there is no

further doubt regarding the position of the organ. Unfortunately, even when solutions of fluorescein are employed, the results are by no means constant, and it is often impossible to see the light, or, if it is seen, to get it to move in the desired direction.

To my mind the examination of the stomach by means of the *x*-rays is greatly superior to all other methods for the following reasons: It is speedy, it is precise, and it gives a variety of information that cannot be obtained by any other method. It is true that sometimes the pictures are indistinct and unsatisfactory, so that the results cannot be regarded as sufficient in every instance; but in at least 90 per cent. of those of my cases in which Dr. Pancoast employed it during the past winter the results were practically perfect.

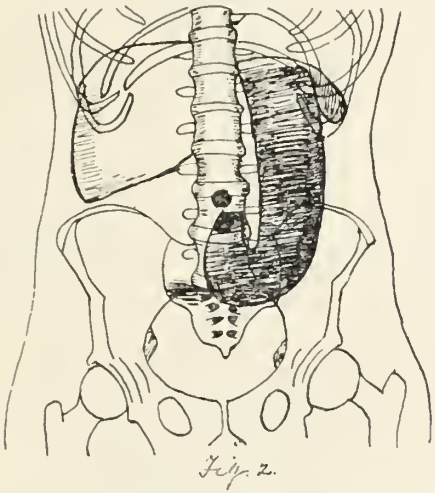

FIG. 2.—The same patient, skiagraphed after application of an adhesive abdominal support. The umbilicus has been elevated with the flaccid abdominal wall. The effect upon the stomach seems to be a very slight elevation and alteration in contour of the greater curvature. The "kink" is less pronounced. There was more relief of symptoms than the skiagraphic appearance would seem to indicate. Referred by Drs. Sailer and Worden.

When I speak of the variety of information that is obtained by the use of the *x*-rays I refer not merely to the outline of the greater curvature of the stomach, but also to the distinct outline of the lesser curvature and its character and peculiarities. Moreover, in the majority of cases the position of the pylorus is indicated as sharply and clearly upon the plate as the position of the greater curvature. It shows as a transverse dark line between the shadows of bismuth suspension in the stomach and of the small portion which has already penetrated into the duodenum. The importance of a clear knowledge of the condition of the lesser curvature

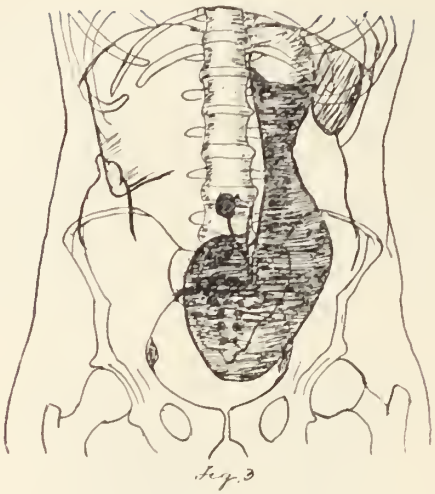

Fig. 3.—Extreme gastroptosis, with dilatation, low position of the pylorus, and a decided "kink." This is the typical shape of the stomach in them ajority of cases of ptosis. The organ occupies a vertical position, and there is more or less narrowing below the cardiac end and the dilated fundus sags downward toward the pelvis. The skiagraph of this case shows the positions of the two flexures of the colon by the differentiation due to the collection of gas at these points. An operation was subsequently performed upon this patient. Referred by Dr. Sailer.

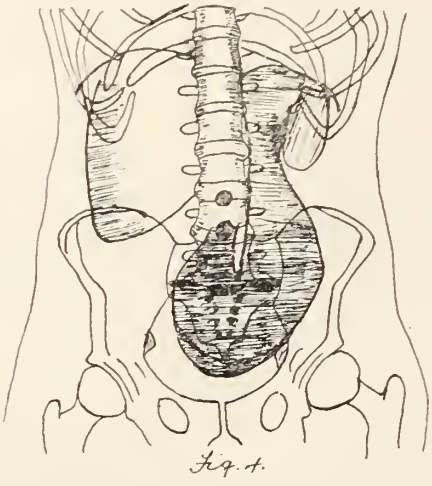

Fig. 4.—A case very similar to the preceding one.

I believe has not hitherto been properly appreciated, but in not one of the cases in which the lesser curvature was folded back upon itself with a sharp bend about the middle was there a failure of retention. And in the cases in

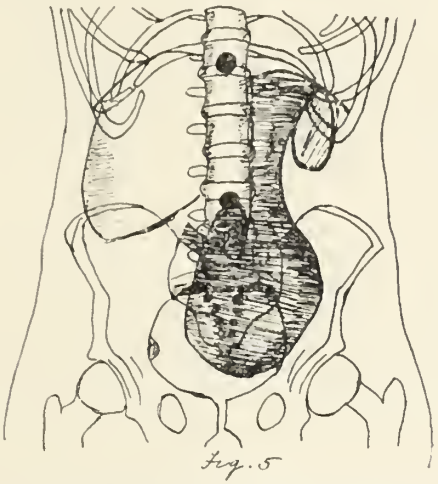

FIG. 5.—The same patient, skiagraphed after application of an adhesive abdominal support. The umbilicus has been elevated with the abdominal parietes, but there is no change in the stomach except that the "kink" is not so sharp. Referred by Drs. Sailer and Worden.

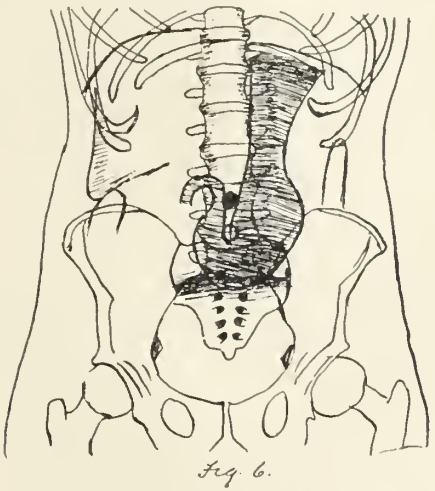

FIG. 6.—A case with a lesser degree of ptosis and dilatation, but with a marked "kink." The pylorus occupies a position nearer normal. This patient was an unmarried young woman with exceptionally good physical development. Referred by Dr. Sailer.

which there was hypermotility it could very clearly be seen that the lesser curvature appeared as a continuous curved line. The obvious conclusion is that in those cases of gastroptosis with retention of gastric contents (and I believe that this retention is probably the most serious result of the ptosis) our object should be if possible to eliminate this kink, and I am rather inclined to believe that various operations that have been done upon gastroptosis with considerable success act less by actually elevating the stomach than by straightening the lesser curvature. This is particularly true, I think, of the operation performed by Dr. Beyea. Gastroenterostomy, on the other hand, without measures designed to relieve the kinking, can only be regarded as a makeshift.

But the information yielded by these *x*-ray pictures regarding many other organs within the abdomen is considerable. Not infrequently the spleen can be seen causing a distinct depression in the fundus of the stomach. It seems unlikely, however, that such a depression could interfere in any way with the motility of the organ. The position of the duodenum can rarely be traced for more than an inch or two. On the other hand, the position of the splenic and hepatic flexures is usually easily made out on account of the presence of a bubble of air which shows upon the print as a clear area usually traversed by lines representing the folds in the colon. Often the position of the transverse colon can also be distinctly observed.

It is worth while, I think, to note in passing that the original contention of Glenard that in cases of splanchnoptosis the hepatic flexure of the colon is lower than the splenic flexure of the colon, seems to be almost invariably true. Glenard, of course, regarded the descent of the hepatic flexure as the most important element in splanchnoptosis, and probably the primary one to which all the others were due. Nowadays we are more inclined to look upon the condition as, in the majority of cases, entirely congenital, no one organ or group of organs being more implicated than the others.

The value of the routine examination of the stomach, as an indication for treatment, cannot I think be overestimated. To instance a few of my cases: Miss G. was muscular, well-developed, with a short trunk and exceptionally broad hips, in whom inflation and percussion had failed to suggest displacement of the stomach; but the discovery of an extreme degree of gastroptosis, followed by the application of a satisfactory binder, produced almost immediate relief. Mrs. F. was a tall, powerfully built young woman who had been quite athletic, but who in the last year had emaciated very rapidly. The radiogram indicated that the greater curvature of the stomach was very near the symphysis, that the lesser curvature was sharply bent, and that the pylorus was just to the right of the umbilicus. An efficient binder caused a gain in weight which for several weeks averaged a pound a day.

The *x*-ray method is also of value in studying the results of treatment,

In one patient, upon whom gastroenterostomy had been performed by Dr. Martin for stenosis of the pylorus, it was easy to see that the abnormal opening was acting splendidly, the bismuth passing readily into the small intestine at that point.

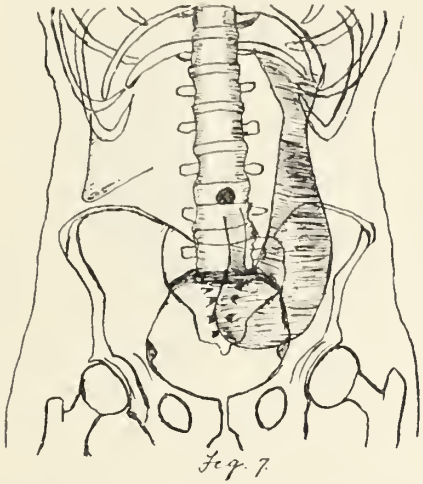

FIG. 7.—Gastroptosis, with "hour glass" constriction, with spasmodic contraction so tight that the bismuth suspension was introduced with difficulty. The patient subsequently underwent an operation. Referred by Drs. Sailer and Rhein.

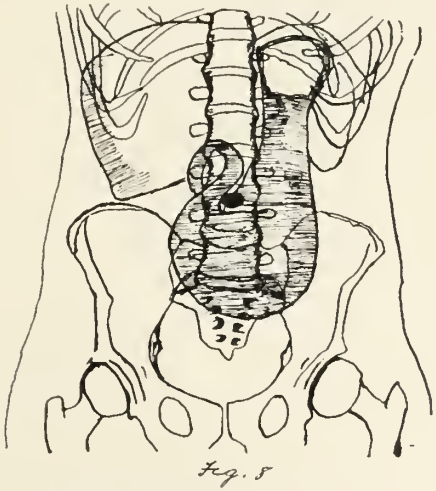

FIG. 8.—Gastroptosis, marked gastrectasis, and pyloric "kink." Referred by Dr. Musser.

This method has hitherto proved less satisfactory in stout than in thin persons. Otherwise, aside from the defects in the apparatus or plates, it presents no difficulties. It is not, however, without certain dangers. Several cases have exhibited the symptoms of poisoning which have been

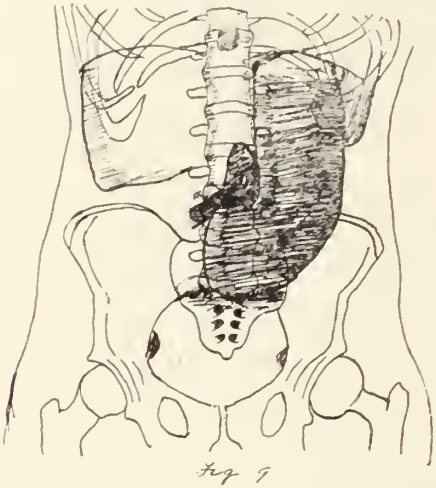

FIG. 9.—Gastroptosis and gastrectasis, without such marked elongation as is present in the preceding cases. Referred by Dr. Frazier.

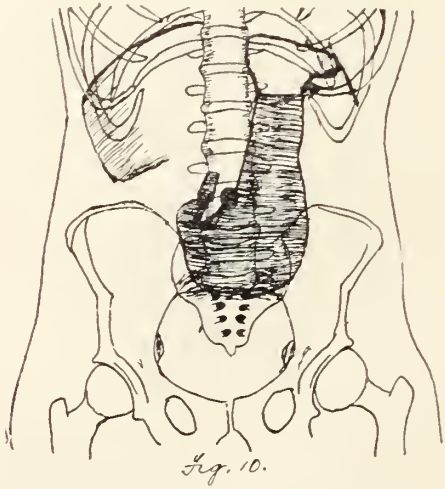

FIG. 10.—Moderate gastroptosis and gastrectasis, and low position of the pylorus, without a sharp "kink." Referred by Dr. Sailer.

so similar that we have been led to assume a common cause. Four such cases have been under my observation, and two of them were severe.

Miss M. received two ounces of bismuth in suspension about 4 P.M. About 5 A.M. the following morning she awoke in great distress with dyspnœa. She felt very weak, and had distinctly the fear of impending death. I saw her about 7.30 P.M., and at that time the symptoms had, according to her mother and sisters, not altered perceptibly. She was deeply cyanosed; the respirations were between 30 and 40 per minute; the pulse was full and bounding; the heart's action could easily be felt through the clothing; and there was still profound weakness and fear of death. In addition the patient complained of slight nausea. Upon careful inspection the cyanosis had a distinct ruddy tinge similar to that seen in cases of polycythemia. Unfortunately it was impossible at that time to make a blood count. The patient was given hot coffee by the mouth and strychnine and morphine hypodermically. The coffee was almost immediately vomited and the patient felt relieved. In a short time she became sleepy, and in the course of the afternoon had almost entirely recovered, although as a matter of precaution I kept her in bed for several days.

Mrs. P. received between two and three ounces of bismuth in suspension at 11 A.M. About 10 P.M. her symptoms became alarming, and Dr. Johnson, of Chestnut Hill, was called to see her at my suggestion, after a consultation over the phone. He described the symptoms as essentially the same as those in the previous case: cyanosis, the fear of death, rapid respirations, weakness, dyspnœa on slight exertion, and nausea. Coffee was administered, causing her to vomit with some relief. The symptoms gradually abated, and when I saw her about 1 P.M. the following day she had practically recovered.

After excluding antimony and arsenic we were at a loss to account for this poisoning, until a physician who is a patient of mine suggested the analogy of the symptoms to excessive doses of nitrites. It seems very likely that this is the explanation, for Werner (*Münchener med. Woch.*, January, 1906) has recently shown that trypsin is activated by the *x*-rays, and it is altogether possible that some disintegration of the subnitrite is produced in this manner. Undoubtedly the action occurs only after the bismuth has been some time in the intestine and exposed to the activity of the ferments, and long after the direct effect of the rays upon the bismuth has ceased. Lavage after the exposure or the employment of some other salt of bismuth will obviate the possibility of this accident.

Its value in determining the position of the colon is not yet, from a practical point of view, as great as its value in determining the position of the stomach, for the reason that displacements of the colon are not nearly so amenable to medical treatment, if we can include in the methods of the internist the

application of binders, rest in a horizontal position after eating, and other measures designed to facilitate the emptying of the stomach. On the other hand, as an indication for operative interference in those cases where the displacement of the colon is so great as to cause chronic constipation and

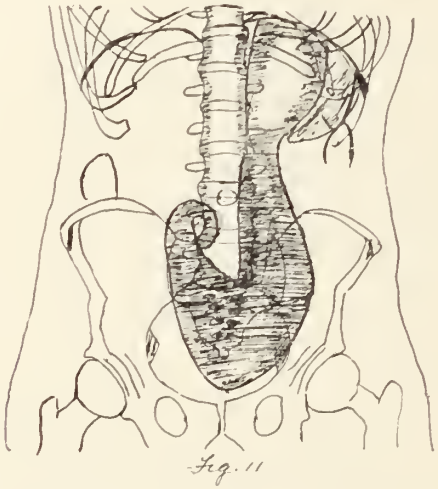

FIG. 11.—Extreme gastroptosis and very much elongated stomach. Referred by Dr. Sailer.

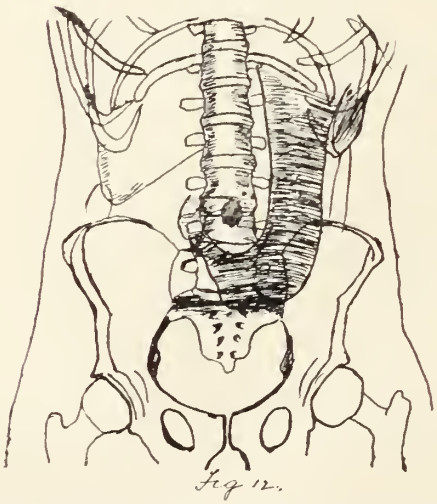

FIG. 12.—Moderate gastroptosis with hypermotility and hyperacidity. The pylorus is low and there is no "kink." Referred by Dr. Sailer.

various other diabilities, it is of paramount importance, and I believe can be replaced by no other method.

In consequence of our investigations upon enemata and the results of injections of bismuth into the colon I have reached the conclusion that it is not necessary to insert a rectal tube in giving injections into the colon further than the internal sphincter, that is, for a distance of three or four inches. For over a year now I have followed this method, to the considerable comfort of my patients, without having had any reason to suppose that the enemata were not as efficient as by the usual method of the insertion of a rectal tube for eight or nine inches. It has been my impression—unfortunately it is a subject upon which precise data are difficult to obtain—that the enemata were really much better retained than by the other method of injection.

Dr. Henry K. Pancoast: Since the preparation of Dr. Worden's paper and up to the present time (June 15th) the number of cases examined by the bismuth method in the *x*-rays laboratory of the University Hospital for various lesions of the œsophagus and the gastrointestinal tract has been increased to seventy-eight, and one hundred and sixteen radiographs have been made. Although originally it had been the intention to describe the technique employed in the first forty cases examined in this manner, it seems proper that at this much later date we should include in this portion of the article a report of all cases referred to our laboratory up to the present time. Within a few months the field for *x*-ray diagnosis has been considerably broadened, as wider applications and greater possibilities have been found.

Most of our patients have been referred by members of the University Hospital and Dispensary staffs. In addition to cases in their own private practices, Dr. Sailer and Dr. Worden have lent valuable experience and augmented the interest in the work by adding to the list patients from their services in other hospital dispensaries.

Our first observations were more of an experimental nature than for the application of any practical diagnostic value in the *x*-ray examinations. With a view of determining some facts in regard to reversed peristalsis in the large intestine several patients were skiagraphed after rectal injections of bismuth subnitrate in suspension. (See Plate V.) When it was found to be comparatively easy at that time to obtain satisfactory outlines of the colon, sigmoid, and rectum by what seems now to have been rather crude methods, it is hard to realize that no practical use should have been made of such possibilities until November, 1905. It was at this time, however, that glowing reports from numerous sources awakened the medical profession to the fact that they had at hand a valuable and reliable method of diagnosis. It cannot be said that the very large experience of the past six months has given the least discouragement to our expectations.

The *x*-ray examination by means of the bismuth shadow is applicable to every portion of the alimentary tract below the pharynx. The radiographic technique will be described as applied to the stomach, intestinal tract, and œsophagus in the order named. The examinations have been

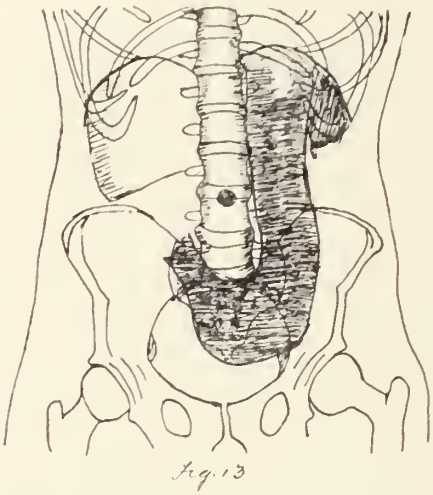

Fig. 13.—Marked gastroptosis, gastrectasis, low pylorus, without "kink." Referred by Dr. Sailer.

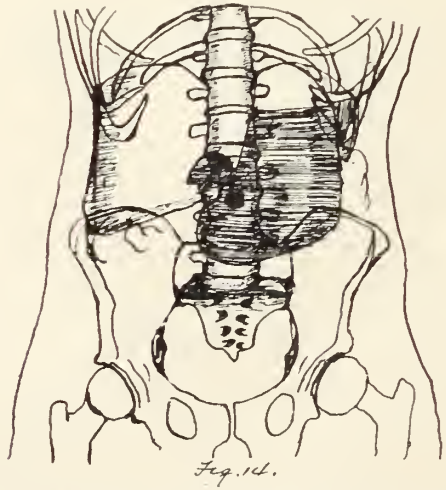

Fig. 14.—Moderate gastroptosis, gastrectasis, and tendency to kinking. Both flexures of the colon are low. Referred by Dr. Sailer.

made entirely by the use of the skiagraphic plate. The loss of several lives, the necessary amputations of numerous fingers and hands, and the existence of painful and practically incurable burns among *x*-ray operators, all due in a great measure to the use of the fluoroscope, should be a warning against any unnecessary use of this instrument for experimental purposes. These grave results, and unfortunately there are others equally serious, make it the most dangerous instrument in the hands of the physician, no matter how carefully it is used or what precautions are taken against exposure. Nothing much less than armor plate is impervious to the rays used in the examinations of this part of the body.

The Stomach. The examination of the stomach is the easiest of any portion of the tract, though it must be borne in mind that all of this work is tedious and is more consuming of time than any other *x*-ray work. The revelations of radiographs of the stomach have been surprising in a great many of the cases and the results of the examinations have invariably been of considerable value. Dr. Worden has called attention to the fact that in no two instances do the stomachs appear alike in shape, size, and position, and though this is certainly true, there are certain points of similarity that enable us to classify them roughly into several groups or types. In the accompanying cuts or diagrams we have endeavored to show at least one example of each class.

The details of the various steps in the radiographic technique follow:

1. Preparation of the patient. For a skiagraph of the stomach alone very little previous preparation is necessary beyond having the stomach empty. In the absence of gastric retention a light and easily digested meal a few hours previous will not necessitate a preliminary lavage.

2. It is essential that no clothing shall be worn during the operation which will in any way interfere with the details of the skiagraph. Considerable exposure of the person is required in order to place the patient in proper relation to the plate and to bring the *x*-ray tube in relation to certain landmarks on the body. Unless this part of the work receives careful attention the result of the examination is valueless in determining the true anatomical relations. The exposure of the person is not a matter of much moment to male patients, but it is advisable with women to give due consideration to their feelings of modesty. We are in the habit of having our female patients retire to the dressing-room, where with the assistance of a nurse they don a muslin garment consisting of a cape and skirt. The cape, fastened around the neck with a draw-string, drops loosely to the hips and is easily lifted up back or front when adjusting the plate and tube. The skirt is held tightly around the hips and just above the pubes by a draw-string. There has never been the slightest objection to appearing in such a costume.

¶ 3. In order to produce a shadow of the stomach outline, some substance more or less opaque to the *x*-rays must be introduced. Invariably the subnitrate of bismuth has been employed, and may be given mixed with solid food, such as mashed potato, or suspended in milk or mucilage of acacia.

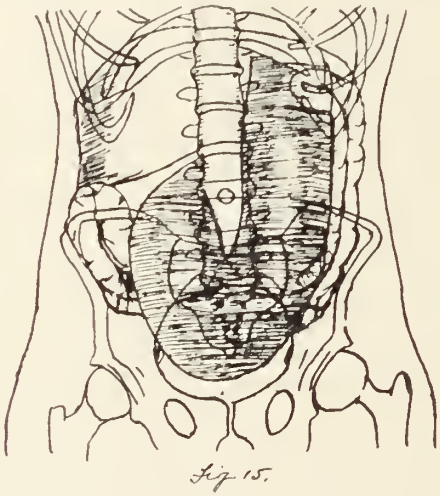

FIG. 15.—Extreme gastroptosis and gastrectasis. Relatively high pylorus. Referred by Dr. Sailer.

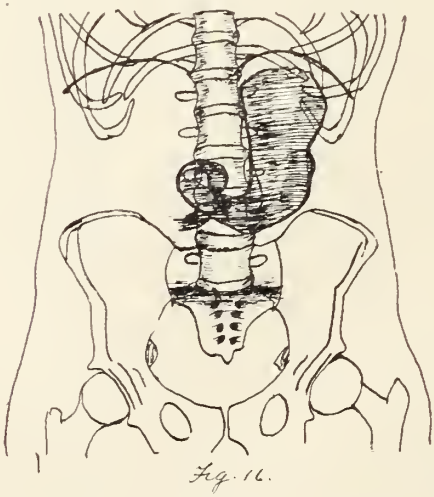

FIG. 16.—Moderate gastroptosis, with hypermotility. Compare with Fig. 12. Referred by Dr. Sailer.

The former method is perhaps preferable when the gastric motility is to be determined. It is a curious fact that so far none of our cases has been referred for this examination. Up to this time we have in all instances used a suspension of subnitrate of bismuth in mucilage of acacia in the proportion of two ounces of the powder to the pint. Even when carefully prepared the bismuth rapidly settles into a compact mass, and for this reason and because of the dangers attending the use of large doses of the subnitrate we are about to experiment with a special permanent chemical suspension of the subcarbonate in water. The objections to milk suspensions are the inability to keep them for any length of time and the difficulty of subsequent lavage on account of curdling. There are two methods of administration, either by the stomach tube or by having the patient drink the emulsion. We prefer the latter, first, because the patient does not have to take the tube twice if subsequent lavage is performed; and secondly, because, as Dr. Sailer believes, the bismuth begins to leave the stomach sooner. The pars pylorica and the duodenum are shown better, therefore, when the suspension is swallowed.

The amount of the mixture employed depends largely upon the results desired. In our earlier cases we used one quart of the suspension or four ounces of bismuth, as this quantity produced a dense and clear shadow, and represented approximately the bulk and weight of an ordinary meal, including liquids. This amount, however, is not always sufficient to demonstrate the extreme degree of dilatation in all cases, but this difficulty may be easily overcome either by administering a larger quantity of a weaker emulsion or by having the patient drink the necessary quantity of milk before the emulsion is taken.

The dangers attending the administration of excessive doses of the subnitrate of bismuth are of sufficient importance to demand careful consideration. In addition to the four patients in whom toxic symptoms were observed, as reported by Dr. Worden, we have since had two more. In the first few cases four ounces of bismuth were allowed to remain in the stomach; there were no deleterious results, not even constipation; it was concluded that this drug was inert except for its sedative action, and non-toxic. But unfortunately there soon followed a series of cases in which there developed alarming but not dangerous toxic symptoms, very similar in each instance. In one to four hours after the administration the patients complained of nausea, or even vomited, especially when food was taken. They became markedly cyanotic, and were considerably prostrated. The pulse was rapid and full and the respiration rapid. These phenomena lasted several hours. For a time it was thought that they were manifestations, though not at all typical, of arsenic, or possibly antimony poisoning, despite the fact that the bismuth used was guaranteed to be free from such contamination.

The absence of pain was ascribed to the sedative action of the bismuth. The last or sixth toxic case was a surprise, and was also peculiar in that the emulsion had been administered by enema olny. Two ounces of bismuth were used and allowed to remain in the bowel. Absorption must have been confined entirely to the large intestine, because all of our experiments have

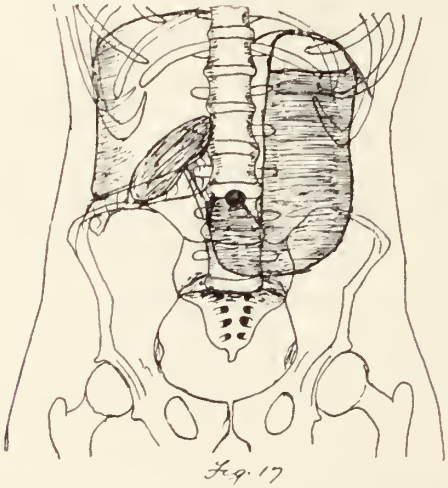

FIG. 17.—A composite diagram of two skiagraphs, showing a gastroptosis, movable right kidney, and liver displaced downward on deep inspiration. Referred by Dr. J. A. Scott.

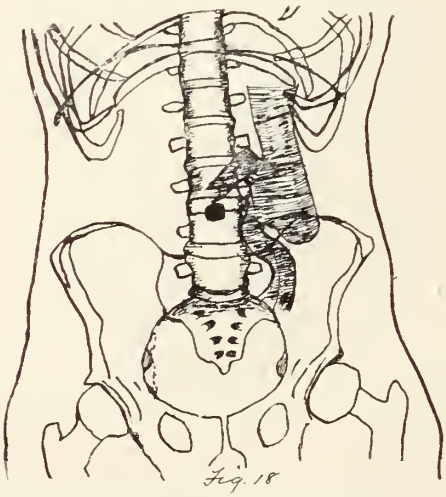

FIG. 18.—Gastroptosis after gastroenterostomy. The bismuth is clearly seen escaping by both the normal and artificial openings. Referred by Dr. Sailer.

so far shown that bismuth thus administered is not carried beyond the ileocæcal valve. It is possible that the toxic symptoms in this case may have been due entirely or in part to the fact that after the excessive purging attending the preparation of the patient, the walls of the bowel were unusually active in absorption under the sedative action of the drug.

Confronted by so many of these annoying accidents we determined to investigate the cause of the apparent poisoning. Two separate samples of the bismuth we were using were carefully analyzed by Dr. D. W. Fetterolf for the presence of poisonous impurities, and both were found to be absolutely free from any traces of either arsenic or antimony. It was then concluded that the toxic symptoms were the result of an idiosynerasy on the part of some individuals to bismuth itself. About this time, however, a physician who was about to submit himself to a skiagraphic examination of his stomach suggested to Dr. Sailer that the symptoms as described to him were similar to the phenomena following the administration of excessive doses of the drugs of the nitrite group. This suggestion has been accepted as explaining the difficulty, and it has been concluded as probable that some one or more of the intestinal ferments under certain conditions and in some individuals are capable of decomposing the subnitrate of bismuth with the formation of a nitrite in amounts sufficient to cause toxic symptoms. This action may or may not be influenced by the *x*-ray. It seems improbable that this chemical change occurs in the stomach, as the phenomena are never fully manifest until some time after the administration, and bismuth in suspension, as we have employed it, does not remain in the stomach very long. Moreover, in one case it was confined to the large bowel only. Everyone knows that bismuth salts rapidly undergo chemical change in the intestinal tract. In cases of gastric hypermotility, in which the stomach contents pass rapidly and in bulk into the small intestine, these results might follow more readily. It is also possible that a subnormal peristaltic action of the small intestine may be a factor by allowing the drug to be acted upon more readily with the production of larger amounts of poisonous derivatives.

Whatever the cause of these accidents, it behooves us in the future to use every precaution to prevent dangerous results arising from the administration of large doses of bismuth. This method of diagnosis is of too great value and has been too widely adopted to allow us to give it up on account of such accidents. Our rule at present is not to leave over one-half ounce of the subnitrate of bismuth in the stomach unless the patient can be closely watched for several hours afterward, and even then not more than one ounce should be allowed to remain. If a larger amount has been administered the stomach is washed out as soon as possible after the skiagraphic exposure. One must be sure that the end of the tube reaches the most dependent portion of a ptosed stomach, as the heavy powder always settles there.

When the colon has been examined after the bismuth enema a cleansing injection should follow, in order to remove a part, at least, of the retained drug, and a mild purge is also advisable. In gastric diagnosis the adminis-

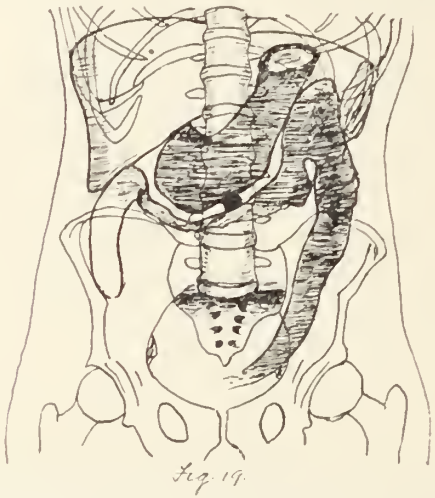

FIG. 19.—Stomach and colon nearly in what is supposed to be their normal positions. Bismuth introduced by mouth and rectum. Referred by Dr. Musser.

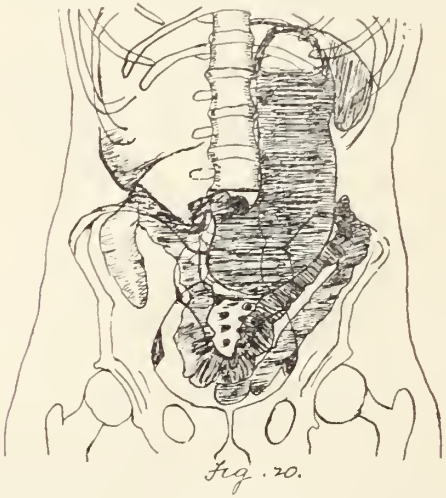

FIG. 20.—Composite diagram of two skiagraphs, showing moderate gastroptosis and marked ptosis of the transverse colon and both flexures. Bismuth introduced by mouth and rectum. Referred by Dr. Sailer.

tration of bismuth in food will interfere with subsequent lavage, and we prefer not to use this method unless for the determination of motility.

There are a few other but less satisfactory ways of obtaining the picture of the stomach by the skiagraph. The original method of insufflation with dry powder is now obsolete, and the introduction of a stomach tube filled with powdered bismuth we have tried and found unsatisfactory and unreliable. (See Fig. 22.) Some radiographers prefer inflation of the stomach or colon. This gives a fairly reliable picture in thin subjects, but is not to be compared to the bismuth skiagraph, and this method is certainly no less uncomfortable to the patient and is not unattended with dangers.

4. The examination should be made while the patient is standing, for in this posture the greater curvature and pylorus are sure to drop to their lowest level, especially with the stomach filled with the bismuth mixture. Moreover, it is in this position that patients with ptosis are more apt to have their symptoms aggravated, and it is the one usually occupied during the day. Numerous instances have been cited in which the stomach occupied its apparently normal position, or nearly so, when skiagraphed with the patient lying on the back or side, but a second picture made while standing showed a marked gastroptosis. As the greater part of the stomach, except the cardiac end and the pylorus, approaches nearer to the anterior abdominal wall than posterior, skiagraphs of this organ should be made with the plate in front of the patient and the tube behind, in order to give the best details and to reduce to a minimum errors of projection. If the patient is unable to stand, a picture may be made in the sitting posture.

5. In order to obtain a good and accurate skiagraph of this kind the proper kind of apparatus and its skilful manipulation are essential. Any radiographer of average skill can make satisfactory pictures of the stomach provided he uses a powerful coil and a suitable tube; but the most experienced operator will fail with inferior apparatus. No more beautiful examples of skiagraphic art can be obtained than those of the gastrointestinal tract, but they are without value unless what they portray is accurate. As in all other radiographic work, a stomach picture may be very misleading unless certain details of technique are carefully observed.

Short *x*-ray exposures are essential and in all persons of average build or in thin people should not exceed fifteen seconds. There are several reasons for observing this rule. The patient must stand perfectly still of course. The breath must be held, for respiratory movements will prevent the obtaining of a clear outline. Lastly, the exposure must be sufficiently short to prevent peristaltic movements from interfering with the distinctness of the shadows. All of our skiagraphs have been made during full but not forced inspiration, simply because it is easier for the patient to hold the breath with the lungs well filled. Respiration has very little if any influence

upon the position of the stomach, though it has been claimed that the greater curvature may descend considerably during forced inspiration. To confirm the findings of other investigators upon this point, two successive skiagraphs were made of one of our patients. The first, made during

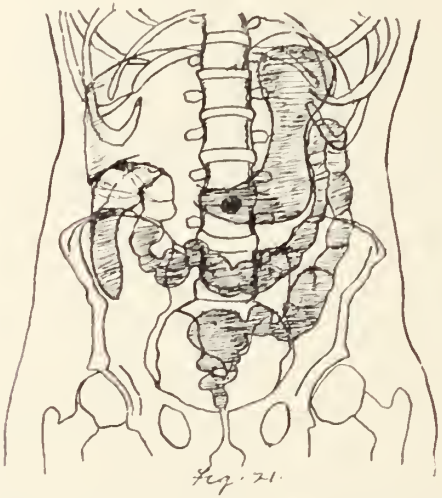

FIG. 21.—Composite diagram of two skiagraphs. Moderate gastroptosis and ptosis of transverse colon. Bismuth by mouth and rectum. Referred by Dr. Clark.

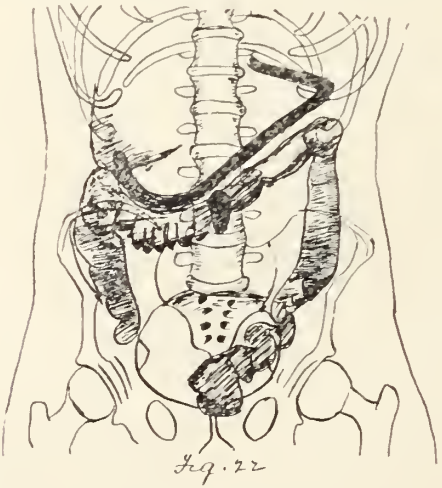

FIG. 22.—Gastroptosis, moderate, with gastrectasis. Very slight ptosis of the transverse colon. A stomach tube filled with powdered bismuth was introduced into the stomach The uselessness of this method of outlining the stomach can be easily recognized. Colon injected by bismuth enema. Referred by Dr. Sailer.

forced inspiration, showed the greater curvature little if any lower than the second taken during forced, expiration. There was a slight change in the shape of the organ.

6. A few universally accepted landmarks are necessary for the proper interpretation of these radiographs. The vertebræ iliac crests, anterior superior spines, and the pubic crests are the normal anatomical bony points, but the position of the umbilicus must always be marked. The shadow of this landmark may be made on the plate by placing a small coin over the spot. If this is to be the point from which measurements are to be made the skiagrapher must be certain that the anticathode of the tube is in the same horizontal plane as the umbilicus and as nearly as possible in the same vertical plane with it and the spine. It is often desirable to mark the level of the tip of the ensiform, and this may be done in the same way as the umbilicus.

The Colon and Sigmoid. The entire large intestine may be skiagraphed by the bismuth method, but, with a few exceptions to be mentioned later, satisfactory pictures of the small bowel, except possibly the duodenum, have not yet been made. The patient requires more preliminary preparation than in stomach work, as the intestinal tract must be emptied previously by thorough, but not excessive, purgation, and just before administering the bismuth suspension by rectum a simple cleansing enema should be given.

The usual method employed is to administer the mixture through a soft rectal tube of as large a lumen as possible. The tube should not be introduced farther than three or four inches, or just beyond the internal sphincter. The best results are obtained by observing this rule. The enema must be given slowly, and no force used either by the syringe bulb or gravity beyond about one foot pressure. The principles applied here are different from those of giving high enemata for other purposes. We wish to guard as much as possible against the bismuth being carried toward the cecum by any force except that of antiperistalsis. The one great secret of the operation itself is to allow the liquid to simply trickle through the tube. Once the outlet of the funnel and the lumen of the tube become completely filled it is almost impossible to get the mixture to run in satisfactorily. The amount usually introduced is one pint of the suspension, representing two ounces of the bismuth salt. When the tube is removed the patient should remain in the recumbent posture for thirty to forty-five minutes before the *x*-ray exposure is made. This time is adopted as a result of the investigations of Dr. Sailer and Dr. Worden in our laboratory about three years ago. This was the average period required for the bismuth mixture to be carried by antiperistalsis as far as the cecum in sufficient quantity to ensure a satisfactory skiagraph. When radiographing the colon the length of exposure, position of the plate and tube, posture, and landmarks are the same as in the technique for the stomach.

It is often of advantage to have the bismuth reach the colon by way of the stomach and small intestine, especially when determining gastric and intestinal motility, or searching for the seat of a partial obstruction in the bowel. Ordinarily, the bismuth given in suspension should reach the colon in amount sufficient for a skiagraph in twelve to eighteen hours.

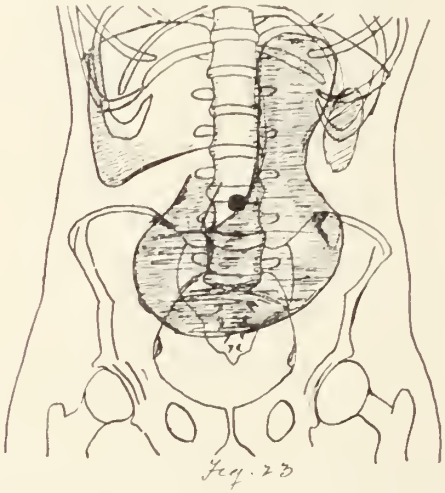

Fig. 23.—Gastroptosis and gastrectasis—before operation.

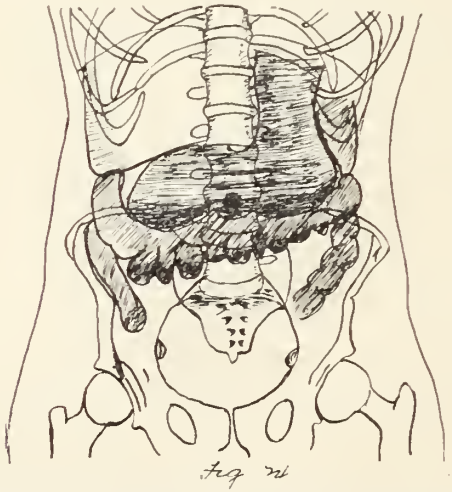

Fig. 24.—The same case, after operation. Bismuth by mouth and rectum. Referred by Drs. Tyson and Clark.

The lower portion of the sigmoid and the rectum are shown best by placing the plate behind the pelvis of the patient, who may be either in the erect or recumbent posture.

Whenever it is necessary or possible to radiograph the ileum or jejunum, the bismuth must be introduced by way of the stomach, in the absence of a fecal fistula, and the plate is exposed in the same manner as for the colon.

(Esophagus. Aside from the detection of the presence of lodged foreign bodies, the œsophagus offers the greatest difficulty of any portion of the alimentary tract to *x*-ray diagnosis, not only for anatomical reasons, but because of the rapid movements of deglutition preventing the lodgment of any opaque substance, such as bismuth. The application of skiagraphic diagnosis is limited practically to the determination of the presence, extent, and site of constrictions, and diverticula. Unfortunately, the number of cases referred to our laboratory during the last six months has been very small and we have been unable to give to any particular modification of the bismuth method a satisfactory trial. Two cases have been skiagraphed with accurate diagnostic results, though the artistic appearance of the plates was poor. In one a partial stenosis high up was found, and in the other a possible malignant stricture low down was excluded. In both cases the radiographic findings were confirmed at autopsy. It must be admitted that our method of having the patient swallow dry powdered bismuth and washing it down with a small quantity of emulsion is crude, and in the future another way of filling the œsophagus will be tried.

The Value of x-ray Diagnosis.

Diagnosis by means of the *x*-rays has been found of greatest value probably in such conditions as fractures and dislocations, foreign bodies, joint disease, and renal calculus; but it seems like a conservative statement to say that we may expect the application of the bismuth method in determining certain conditions of the gastrointestinal tract will in the near future be the next in the order of usefulness. Were it not for the value of this kind of work and the interesting results obtained the tediousness of the dark-room development would give the radiographer sufficient reason for not advocating its frequent application. If the operator is careful in every detail of his technique the results are certain to be accurate. This cannot be said of other methods of examination. The plate shows exactly what is to be shown, and a skiagraphic error is the fault of the radiographic technique or the interpretation of the skiagraph.

There are certain gastric conditions which may be determined with precision, such as the presence and degree of gastroptosis, gastrectasis, the position and shape of the stomach, the situation of the pylorus and lesser curvature, which is often difficult by other means, the existence of a kink

in the pars pylorica, and frequently the results of operation and other forms of treatment. Motility of the stomach may be studied by repeating the first skiagraph made after introducing the bismuth in about six hours, and subsequently as often as desired. A reasonably certain diagnosis of early carcinoma would be of great value, but as yet this is a very remote possibility.

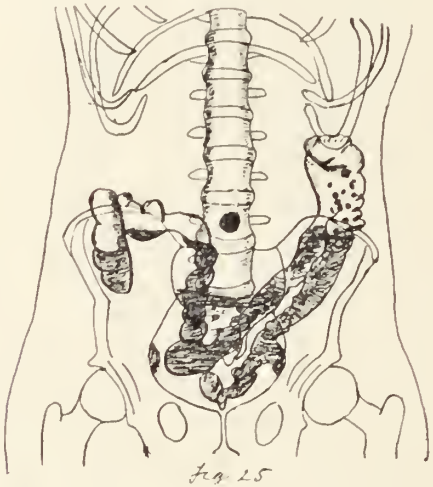

FIG. 25.—Ptosis of the transverse colon before operation.

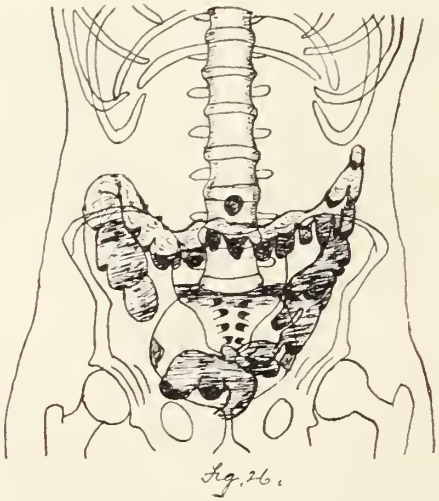

FIG. 26.—The same case after operation. Bismuth by rectum. Referred by Dr. Clark.

In one of the three cases of this kind examined, the appearance of the stomach was sufficiently characteristic to warrant a positive opinion, but the disease had reached such an advanced stage that the diagnosis was almost certain clinically, and was confirmed by an exploratory operation later.

The intestinal tract offers a wide field to the search for practical applications of this method of diagnosis. Little can be accomplished in the jejunum and ileum, but in the one patient examined the results were of considerable value. The case was one of partial obstruction in the jejunum, with a fecal fistula near the point of constriction. A previous operation for the relief of obstruction by adhesions could not be completed on account of the alarming condition of the patient, and an enterostomy was necessary as a palliative measure. Dr. Clark referred the case, with the object of determining the seat of obstruction and its relation to the fistula, and whether a constriction existed both above and below the opening. This knowledge was desirable before performing a second operation Dr. Clark prepared the patient for the skiagraphic examination by injecting into the fistulous opening several ounces of bismuth emulsion. A few ounces of the mixture were swallowed in order to outline the stomach and duodenum. The skiagraphs demonstrated clearly the absence of constriction below and the presence of the obstruction a short distance above the fistula. This condition of affairs was confirmed a few days later and the operation was considerably shortened by the information gained by the examination. (See Fig. 29.)

Two cases of fistula communicating with the descending colon have been examined and their connection with the bowel shown. In one instance the bismuth outlining the colon was administered by mouth because of the inability to introduce it by rectum, and in the other an enema of the suspension was given. In each case a small quantity was injected into the fistulous tract.

Valuable information has been obtained from skiagraphs of the colon. The method of introduction of the bismuth, whether by way of the stomach or by enema, must be selected as best suited to each individual case. Ptosis of the transverse colon and one or both flexures has been easily diagnosed in several patients, and in a few in which adhesions were suspected because of the close relation between two loops (Plate IV.), this condition was confirmed by subsequent operation. The seat of malignant stricture in the descending colon was shown after rectal injection of bismuth in one case, and in another in which cancer of the colon was suspected the skiagraph revealed a very marked ptosis of the transverse colon without any constriction at any point. Thorough purgation proved the obstruction to be fecal.

One case of malignant stricture of the sigmoid has been examined and the seat of the disease located. The bismuth was introduced by way of

the stomach because the obstruction was low down. (See Fig. 28.) Several examinations have been made for ptosis of the sigmoid, with a positive result in two cases, and in one of these (Plate VI.) the diagnosis has been confirmed by operation. (See Fig. 27.)

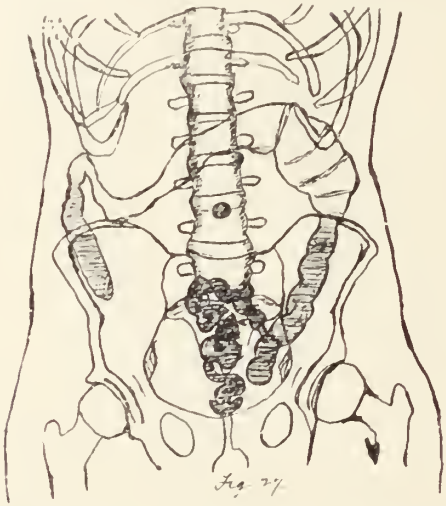

Fig. 27.—Ptosis of the sigmoid. A composite diagram of two skiagraphs. The colon is in normal position, but is dilated above at the splenic flexure. The skiagraphic position of the sigmoid was subsequently confirmed by operation. Referred by Dr. Clark.

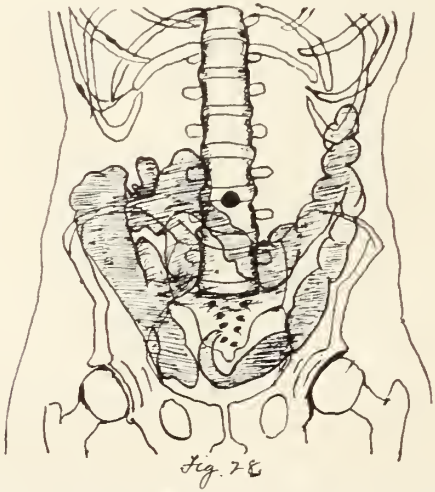

Fig. 28.—Carcinoma of the sigmoid. (Referred to in the text.) The bismuth shadow stops at the seat of constriction. Referred by Dr. Musser.

One of the patients skiagraphed for malignant obstruction of the large bowel subsequently passed a large mass of bismuth that had evidently settled in one of the pouches of the rectum or sigmoid. This incident suggested a possible danger of acute obstruction resulting in such cases if such a mass dislodged from one of the pouches above the seat of disease should become impacted within the area of constriction.

A *resume* of the cases examined follows:

Gastroptosis, examined, 50; positive diagnosis, 49 (males 20, females 29).

Gastroptosis and ptosis of colon, 6; positive diagnosis, 5.

Ptosis of colon, 8; positive diagnosis, 7.

Ptosis of sigmoid, 4; positive diagnosis, 2.

Carcinoma of stomach, 3; positive diagnosis, 1; unsatisfactory, 2.

Œsophageal stricture, 2; positive diagnosis, 1; negative, 1. Intestinal obstruction, 4; positive diagnosis in all; carcinoma of colon, 1; carcinoma of sigmoid, 2; obstruction by adhesions, 1.

Fecal fistula, 3; satisfactory results in all.

Cases used for experiments on antiperistalsis, 3.

The accompanying diagrams were made from the skiagraphic negatives and every effort was made to preserve the anatomical relations as shown on the plates.

Dr. G. G. Davis: Considering the normal relations of the stomach we find its cardiac end situated beneath the seventh costal cartilage one inch to the left of the sternum, about opposite the upper part of the eleventh thoracic vertebra. It is attached to the diaphragm and suspended to the œsophagus. The peritoneum does not embrace it closely, but, particularly on its posterior or under surface, is some distance away. For these reasons the cardiac extremity is practically fixed and retains its position even when the stomach is distended, dilated, or prolapsed. The pylorus is in the midline and moves as much as two inches toward the right when the stomach is distended. It lies opposite the first lumbar vertebra approximately midway between the tip of the xiphoid cartilage and the umbilicus. The greater curvature rises higher in the left hypochondrium than the level of the cardiac opening and descends in the median line to a lower level than the pylorus, its lower edge being two to two and one-half inches above the umbilicus, and may, even when normal, be level with it, thus bringing it opposite the body of the third lumbar vertebra.

The pylorus is almost entirely surrounded by peritoneum, as is also the duodenum, for its first inch.

Thus we see that the pylorus is extremely movable within a short radius. The next eight or nine inches of the duodenum are, however, firmly fastened to the spine, the structures lying on it being covered by the peritoneum only in front. Thus it is seen that extensive displacements of the pylorus are combated by the firm duodenal attachments.

The lesser or gastrohepatic omentum acts as a suspensory ligament for the stomach, but it is attached to the lesser curvature and stretches as it descends.

These anatomical facts should be borne in mind in studying both the physiology and pathology of the organ. It has recently been impressed on the medical mind that the position of the stomach is more vertical than has usually been considered the case. But when we remember that the cardiac end is opposite the eleventh thoracic vertebra and the pylorus opposite the first lumbar, we see one is only two and one-half to three inches lower than the other, so that if the stomach is normal it must of necessity be more horizontal than vertical. The question arises, what is its position when dilated? It is obvious that the cardiac end remains in place, but the

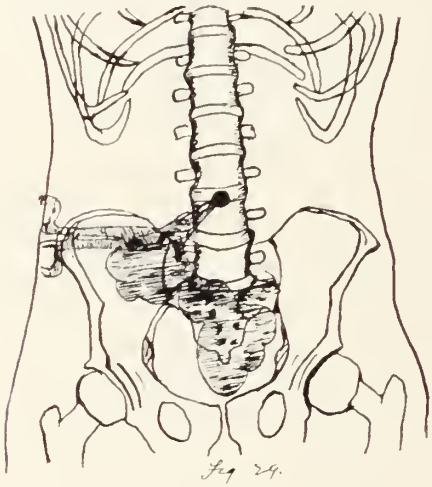

Fig. 29.—Obstruction in the jejunum. (Referred to in the text.) The rubber tube clamped by the hæmostat is in the fistula. Most of the bismuth has passed downward into the dilated loop of gut, although the attempt was made to force it above. The obstruction is at the apex of the triangular shaped shadow. Referred by Dr. Clark.

stretching of the gastrohepatic omentum allows the greater and lesser curvatures to descend. To what extent the pylorus descends is still to some extent in doubt.

From the firmness and extent of the attachments of the duodenum one would expect it to be held up, but recent skiagraphs have suggested that it too descends. Caution should be observed in interpreting these skiagraphs. It seems almost impossible that the pylorus should ever be found in the pelvis. We are in need of accurate postmortem examinations to determine the position of the pylorus and duodenum in cases of marked ptosis.

The shape of the stomach and even of the duodenum is variable. While it is sometimes found postmortem to be of the usual pear-shape, it is not rare to find in formalin hardened bodies that for one-third of its distance from the pylorus the stomach is contracted to the size of the duodenum. This is the motor part and the remaining two-thirds is the reservoir and in dilatation it is mainly this portion which is dilated and which prolapses even into the pelvis. The hour-glass condition is probably normal in certain periods of digestion, as it is often found after death where no organic lesions are present. At times the pyloric end also may be dilated, and even the duodenum itself may be found markedly dilated though not markedly depressed. The shape and position of the stomach is also of interest in relation to its percussion. Ordinarily, there is only an inch or two visible in the median line beneath the edge of the liver with the transverse colon just below it. It is obvious that if, as is often the case, the pyloric third of the stomach is contracted to the size of the duodenum it will give almost or quite a flat tone. I have even seen a couple of coils of small intestine lying next to the edge of the liver with a small part of the stomach visible lower down and the transverse colon below it.

All of this tends to make clinical observations on the stomach, as the region of the median line is approached, extremely unreliable.

Dr. J. Dutton Steele: I think we all are to be congratulated upon having the opportunity of seeing these beautiful plates showing the possibility of outlining the stomach by means of the *x*-rays and making the diagnosis of gastroptosis a matter of scientific accuracy. I do not believe that for the present it will entirely replace the method of inflation. The size and position of the stomach are matters of extreme importance, and yet it seems to me that the value of the *x*-rays will not be so great in showing the size and position of the stomach as in determining the factor necessary in the production of the symptoms of gastroptosis, which factor we do not yet know. We all know that there is some unknown factor that must be present before gastroptosis will produce symptoms, and probably this unknown factor is the more important part of the symptom-complex. It has become the fashion to place much weight upon the state of the gastric musculature, but I think no method has yet been suggested for the detection of slight changes in the power of the gastric muscle which has borne the test of time. I hope that the use of the *x*-rays will enable us to determine how much the displacement of the stomach downward has to do with causing gastric motor insufficiency; whether kinking of the pylorus or of the duodenum is the cause of gastric motor insufficiency, or whether these are the factors for which we are looking in the production of symptoms. The bearing of this upon the treatment of gastroptosis is of the most extreme importance. I can only hope that this work is merely the beginning of a study of these more obscure conditions of the stomach musculature.

Dr. John H. Musser: I have nothing to say, except to speak in commendation of the excellent work of Dr. Pancoast, Dr. Worden, and Dr. Newcomet, with all of which I am familiar, and to endorse very largely what Dr. Sailer has said with regard to the value of the procedure. I feel, however, that it is only fair to say that in my experience the results of such examinations always have been confirmatory of what had been thought to be present beforehand. Of course, that does not lessen the value of the work, for if we wish to determine the position of organs we do it because we want to decide upon certain important surgical procedures and therefore it is the duty without doubt to use all measures and the most exhaustive procedures in order to come to a correct conclusion as to the nature of processes. I can understand that we may get information in regard to the transverse colon that we cannot get by other means. Beyond doubt we are only in the early stages of such procedures and I have no doubt that the further development of this work will show much of greater interest.

Dr. George E. Pfahler: Upon the same line upon which Dr. Steele spoke, and supplying the information which he desires Dr. Anders has a patient at present in the hospital who has marked dilatation of the stomach as shown by the *x*-rays and while the food moved out of the stomach in the greatest bulk rather promptly, yet part of it remained in the stomach for forty-eight hours and rested on the lower portion, which shows the marked deficiency of the motility of the stomach. I have been in the habit of taking the plates at intervals of six, twelve, twenty-four, and forty-eight hours and in this way I could determine the motility of the stomach and bowel.

SACROCOCCYGEAL TUMOR (TERATOMA).*

WITH AN OPENING ENTIRELY THROUGH THE SACRUM, AND A SINUS PASSING THROUGH THIS OPENING AND COMMUNICATING WITH THE RECTUM, THE SINUS RESEMBLING A BRONCHUS.

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AND
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PROFESSOR OF PATHOLOGY, JEFFERSON MEDICAL COLLEGE, PHILADELPHIA.

SURGICAL REPORT. BY DR. KEEN.

Helen W., aged two years, was first seen on October 1, 1902. When born, a moderate sized tumor was noticed in the lumbosacral region. The tumor has grown considerably, so that now its dimensions are 21 x 12 cm., and 5 cm. in thickness. (Fig. 1.) There is a slightly developed hypertrichosis over a considerable area, suggesting a spina bifida occulta. Just below its center there is a small fistulous opening in the skin, but no inflammatory redness around the opening. The mother is quite sure that on two or three occasions when she gave the child an enema, the fluid escaped from the rectum through the small opening. In addition to that, she thinks she has observed more than once a fecal odor. There is a very small amount of constant mucous discharge. There has never been any attack of illness with discharge of pus from the rectum which could be interpreted as the bursting of an abscess posterior to the rectum by which the opening in the rectum could have been established after birth. It is therefore reasonable to conclude that the complete sinus was congenital. No other deformity exists.

October 6, 1902. In order to make a careful examination, I etherized the child today. Posteriorly, in spite of the difficulty caused by the large tumor, I was able to feel, though somewhat obscurely, the edges of an opening in the sacrum just above the fistulous opening. On inserting a finger into the rectum,

* Read October 3, 1906.

I readily found an opening in the sacrum anteriorly, an opening which would admit the end of my forefinger. A probe, which could be introduced 6 cm. into the fistula, but no farther, could be felt through the posterior wall of the rectum, but at no point was I able to detect any communication with the gut by this stiff metal probe, though I suspected its existence. I determined, therefore, to use a liquid, flexible probe, that is, an enema of salt solution. Almost instantly the liquid began to flow through the fistulous opening. It was clear, therefore, that there was a perforation completely through the sacrum, and that the fistula passed directly through this perforation in the bone from the rectum to the skin.

FIG. 1.

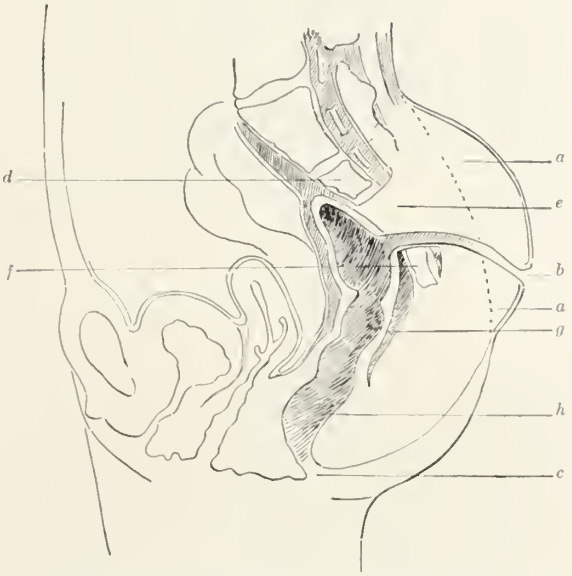
External appearance of the tumor. Notice the opening of the fistula and the moderate hypertrichosis.

As the tumor was growing, I recommended immediate operation, with the view of closing the fistulous opening as well as removing the tumor.

Operation. November 4, 1902. I decided to isolate the fistulous tract (identifying it by means of a probe passed into it and kept in place) so that it would be like an appendix, and then after removing the tumor, to attempt to invert the tubular sinus as one would the stump of an appendix. Accordingly, I made a transverse elliptical incision, inclosing the fistulous opening. I then dissected back the flaps of skin to the periphery of the tumor. Beginning at the margin, I separated the tumor from the tissues anterior to it by blunt dissection, and was able to recognize readily the normal tissue, even the normal fat, as distinguished from the abnormal fatty tissue of the tumor, and to dissect

the tumor from the deep fascia all around, until the fistula was left as a sort of pedicle. When I had dissected the tumor nearly to the fistula, I readily discovered the opening in the posterior wall of the sacral vertebræ. Having separated everything down to the fistula, I then dissected this out, leaving it protruding about 2.5 cm. posterior to the sacrum. On cutting it across I found it to be a tube of considerably larger caliber than the opening in the skin. The external opening, would barely allow an average sized pocket-probe to enter. The caliber of the tube internally was about 4 to 5 mm., and clearly lined with mucous membrane. On account of the rigidity of the wall of the

Fig. 2



Diagrammatic scheme intended to show the supposed relation of the tumor, sinus, spine, and the rectum. *aa*. Tumor. *b*. Mouth of sinus, communicating with the rectum. *c*. Anus. *d*. Second sacral vertebra. *e*. Defect in sacrum. *f*. End of sacrum. *g*. Retrorectal connective tissue. *h*. Rectum.

sinus, however, I succeeded very imperfectly in inverting it, but after closing it with sutures as well as I could, I tied two ligatures of silk around it, in the hope that the resulting raw surfaces would adhere sufficiently to close the tube.

Next I examined the spina bifida. I found its upper posterior margin was at the second sacral vertebra. It measured vertically about 3 cm. and in width about 1.5 cm. No relation of the sinus to the spinal cord or to the subdural space was evident. On the contrary, instead of being lined with endothelium, it was lined with an epithelial mucous membrane. Fig. 2 represents diagrammatically the anatomy of the parts in section. A small bit of iodoform-gauze

was packed over the site of the stump of the sinus. Only three or four ligatures were required, chiefly to a few large veins which emerged through the opening of the spina bifida. What relation the sinus held to the spinal cord I could not determine, save that it did not communicate with the subdural space. The wound was now closed with interrupted sutures and dressed with suitable pressure-pads to eliminate any dead space.

After the operation, her temperature rose to 102.8°. It gradually fell to the normal by the sixth day, but from that time on for two weeks varied between 99° and somewhat over 100°. The margins of the flaps sloughed for nearly a centimeter in the center. This was followed, naturally, by a slight local infection. Undoubtedly her persistent slight rise of temperature was due to that. The wound healed slowly, and was not entirely well till January, 1903. The sinus at first gave no trouble, and was apparently completely obliterated. It soon, however, reopened and persisted. The specimen was given to Dr. Aller G. Ellis, whose report is appended.

PATHOLOGICAL REPORT ON THE FIRST SPECIMEN.

BY ALLER G. ELLIS, M.D.,
ASSOCIATE IN PATHOLOGY, JEFFERSON MEDICAL COLLEGE.

Specimen. Fatty tumor removed from sacral region.

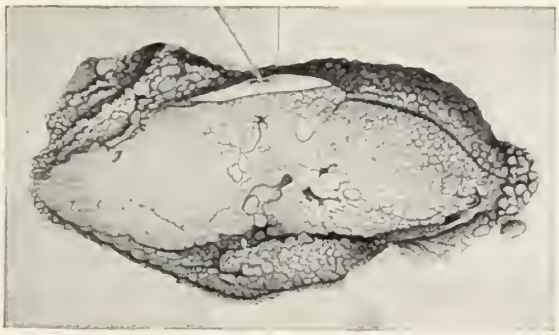
The specimen, received in 10 per cent. formalin solution, is an ovoidal mass of tissue 15 cm. in length and possessing a maximum width of from 6 to 7 cm. It is 3.5 cm. thick and weighs 147 grams. The specimen presents for description two surfaces and a margin.

The first surface (Fig. 3) is convex in shape, and is made up wholly of fat, except at one point. (Fig. 3, *A*.) At this point, which is equally distant from the ends of the specimen and near one margin, is situated a narrow strip of skin 4.5 cm. in length and having a maximum width at the middle of 0.8 cm. It tapers to a point at each end. Two cm. from one end, and very near one edge of this strip of skin, is a depressed area surrounding an opening about 0.3 cm. in diameter. The margin of this opening is formed by infolded, wrinkled skin which is brownish in color. Projecting from the margin are a few short, bristly hairs. A probe passed into this opening traverses a sinus about 2.5 cm. in length and emerges on the second surface at a point shown in Fig. 4, a short distance from a cyst to be described later.

The second surface is concave in general appearance, this being especially true of one half, the depression in the other being partially filled by a projecting mass of tissue, the most prominent portion of which is on a level with the edges that limit the concavity. This surface is also formed mostly of fat, but shows here and there small areas of muscle. At a distance of 7 cm. from one end, practically the midpoint of the specimen, and 2.5 cm. from the margin nearer the piece of skin on the first surface, is situated what is apparently a small,

thick-walled cyst (Fig. 4, *B*) that has been divided into two unequal parts by an incision that extends almost through it. The incised surfaces of this cyst are approximately circular in outline, the larger being 1.2 cm. in diameter. The surfaces are grayish in color, have a glistening appearance, and are moder-

FIG. 3.



A

A. Skin on posterior or external surface of specimen after removal. Just below the leader from the letter *A* is a probe engaged in the sinus, the direction of which is thereby shown. One-third size. From Report 2002.

FIG. 4.

B

Anterior or internal surface. *B*. Small, thick-walled cyst. The internal opening of the sinus contains the tip of a probe inserted from the opposite end of the sinus shown in Fig. 3 One third size. From Report 2002.

ately cupped, showing that the concavity of the cyst had been small. On removing the smaller part for microscopic study, the knife encounters what is apparently cartilage, and investigation shows that the greater portion of the wall, which is quite thick, consists of that tissue, the soft lining being very thin.

Underneath the cyst, and extending for some distance into the projecting mass described, is an area that is shown by puncture to have this same cartilaginous consistence. Toward the opposite extremity of the projecting mass is an irregular, trough-like depression about 3 cm. in length, one side of which shows a number of narrow, transverse folds or rugæ. The tissues of this area have the same general appearance as the other superficial portions of this surface. Less than 1 cm. from the cyst is the opening of the sinus previously referred to. This opening is surrounded by an irregular mass of muscle and fat which practically obscures it when the probe is withdrawn.

A piece of tissue 1.5 cm. long and wide, removed from the specimen in such a way as to include a part of the sinus near its middle portion, shows it to be bounded by a clearly defined, rather dense wall slightly more than 1 mm. thick.

The margin of the specimen is fairly regular in outline, is formed by the junction of the two surfaces described, and presents nothing worthy of note.

The piece of tissue including part of the sinus, to be known as *A*, and the removed portion of the cyst *B*, were hardened in alcohol, infiltrated with paraffin and sectioned. Sections from each were stained by the usual laboratory methods, and on microscopic examination show the following histological structure:

A. The wall of the sinus is composed of smooth muscle, fat, and fibrous tissue, the latter being arranged, for the most part, as a band surrounding the sinus. The lining of the sinus is of two distinct types:

1. The greater portion is formed of many layers of epithelial cells, the superficial being thin and of the squamous variety, the deeper layers being more polyhedral in shape. In some parts the squamous layers are practically all that are present. In others, a few of the deeper layers are of the polyhedral type, while at a few points the polygonal cells are very numerous, dipping down, and giving the structure a resemblance to normal skin. At these points, however, a rather indistinct structure resembling a basement membrane is present. The deeper cells present no special characters distinguishing them from those more superficially placed. Many of the superficial layers possess the usual microchemical reactions of kerotohyalin.

2. At points this stratified squamous epithelial layer changes abruptly, and without apparent change in the underlying tissue, to a layer of tall, columnar ciliated cells placed on a fairly well-marked basement membrane. In some of the sections this columnar cell-lining occupies one-third or more of the circumference of the sinus; in others, but a small part. Small areas show some desquamation of the columnar cells, especially near the junction of those with the stratified squamous variety. At points these epithelial cells dip down, forming either tubules or the openings of glands. (Fig. 3, *A*.)

Immediately beneath the epithelial lining of the sinus is a zone, varying in width, of loose areolar tissue, very rich in cells, of the mononuclear or lymphoid

type, and of various sizes. At a few points, collections of these cells extend for some distance into the underlying tissue. The densest accumulations of them are situated beneath the columnar cell areas described, and at two or three points extend through the latter to the free surface, the columnar cells being absent, or displaced or fragmented, as though the mononuclear cells had infiltrated that area.

At one point (Fig. 2, *a*) deeper in the wall of the sinus can be identified two areas of cells that have no apparent connection with those just described. The one area is irregularly circular in outline, and is made up of cells and matrix closely resembling the zone immediately beneath the epithelial lining of the sinus. Several points in this area appear to be cystic, as there are distinctly outlined cavities bordered by the loose areolar matrix, in which the cells of this area are placed. The second area of cells, ovoidal in outline, is closely approximated to and continuous at one point with the first area. The periphery of this area is formed of cells apparently identical with those in the first area, but in the central portion the nuclei are much flattened and elongated, assuming in some instances a spindle shape. Slight, if any, cystic change is present at this point.

The outlying portions of the sections including the sinus, are made up mainly of muscle and fat. Some of the muscle bundles apparently have been the seat of a degenerative process of some sort, as they present a homogeneous, colloid appearance and manifest unusual tinctorial reactions. Bloodvessels are fairly numerous throughout the wall.

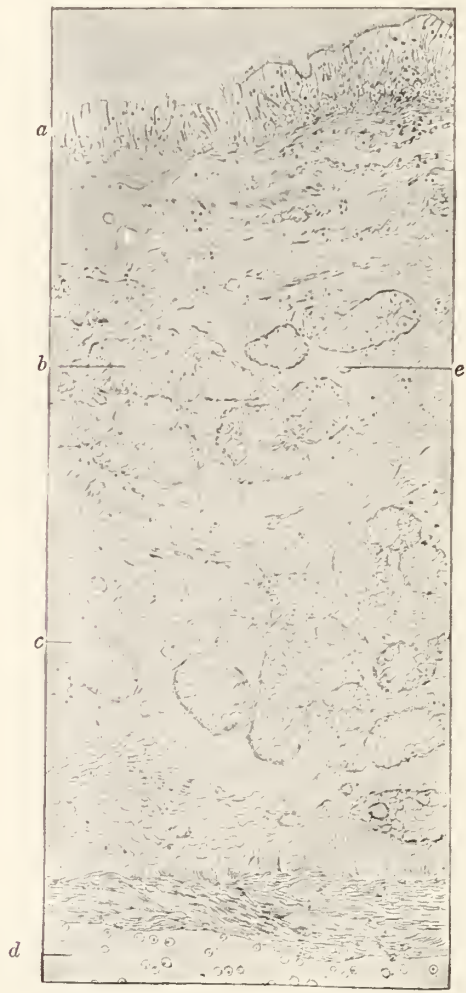
Cross-sections of branched tubular mucous glands are also seen. (Fig. 3, *A*.) As these are identical with glandular elements in the cyst-wall, they will be described later.

B. Examination of sections from this portion of the specimen passing through the entire cyst-wall at once shows it to have a histological structure which resembles in the most striking manner that normally found in the wall of a bronchus. (Fig. 5.) There are present in succession, from without inward, muscle and areolar tissue, a broad band of apparently normal hyaline cartilage surrounded by its perichondrium, submucosa containing transverse and longitudinal sections of mucous glands, and a distinct basement membrane surmounted in areas by tall, columnar, ciliated epithelial cells. These cells show varying degrees of desquamation, being entirely absent from the greater extent of the surface. At points in some of the sections showing no epithelium, there are on the surface projections or fragments of muscle and loose areolar tissue containing bloodvessels. The submucosa shows some cellular infiltration, and at areas the epithelial cells lining the tubules of the mucous glands are desquamating and exhibit fragmentation.

The glands referred to as present in the submucosa of parts of the sinus and in the cyst-wall are histologically fairly uniform. Sections so fortunate as to

show clearly duct openings on the free surface have not been obtained, but dipping-points with changes in the superficial epithelium, such as are usually noted in the mouths of ducts, have been encountered frequently. In the sub-

FIG. 5.



Section of cyst-wall. Showing trachea-like structure in tumor. *a*. Ciliated epithelium. *b*. Gland. *c*. Gland. *d*. Cartilage. *e*. Vessel.

mucosa the glands show lobulation with a varying degree of clearness. In suitable sections such lobules are composed of twenty to thirty or forty units, each unit being a transverse section of a tube and composed of a membrana

propria, upon the inner surface of which is placed the usual glandular epithelium, and beneath which is the interstitial connective tissue carrying the blood-vessels. The epithelium in different areas, or even in different parts of the same tubule, sometimes shows the characters of fully distended, secreting cells, while at other points these bodies are empty. In many of the lobules branching tubules can be seen. The intralobular ducts are of the type usually seen in mucous glands.

Diagnosis. The histological findings in this specimen indicate that it is a variety of the congenital sacrococcygeal malformations that include dimples, sinuses, and cysts. The sinus in this instance is lined partly by a structure resembling skin and partly by a structure resembling mucous membrane, the formative attempts having proved more or less abortive in each case. The cyst, if such it is, has an almost perfect bronchial structure. This qualifying statement is made because there is some doubt as to this portion of the specimen being distinct from the sinus. Although there is no direct connection between the two in the specimen as received, we are inclined to the view that there was such connection originally. This view is supported, to some extent, by the proximity of the two structures, and more strongly by the presence in the sections containing the sinus of tubular glands having the same structure as those found in the wall of the so-called cyst.

The point raised is not of great importance, except as determining whether the condition present is that of a sinus and a cyst, or is simply that of a sinus, the so-called cyst being its terminal point. In either case, the teratomatous tendency of these formations is evidenced in the sinus and by the presence of a wall presenting the histologic characters of a bronchus.

October 26, 1903. Her general health since the operation, nearly a year ago, has been very good, and she has grown rapidly, but the small sinus which reopened still persists at the site of the original opening. As far as the probe can detect, it is about 3 cm. deep. I advised another operation, believing that most probably, as there had never been any escape of gas or any fecal odor, but only a few drops of pus each day, it was probably now merely a blind sinus terminating in a cul-de-sac.

Second Operation. October 29, 1903. Before beginning the operation, in order to determine whether the sinus opened into the rectum as before, I repeated the manœuver preceding the first operation, that is, I injected into the rectum, a considerable amount of salt solution. Before the first operation, this immediately welled through the sinus; today not a drop appeared, though I injected a much larger quantity than at the first operation.

A probe was first passed as far as possible into the sinus. An elliptical incision was then made transversely above and below the probe, and the tissue all around the sinus dissected out. I finally divided the foot-stalk or pedicle by which it seemed to be connected to the deeper tissues; and after the operations, on splitting open the sinus, I was pleased to find that I had passed about

5 mm. below the apparent end of the cul-de-sac. A finger could be inserted from the back into the opening in the sacrum, and could also be felt by a finger in the rectum. No sinus could be detected by the probe or otherwise. The wound healed without any reaction in a few days, and has never reopened.

PATHOLOGICAL REPORT ON THE SECOND SPECIMEN. BY DR. A. G. ELLIS.

Specimen. Tract of sinus removed from sacral region.

This specimen consists of a small piece of tissue 3 x 3 cm. and 0.8 cm. thick. The surfaces are rough and grayish in color, except a narrow groove near the center, which partially divides the specimen into two nearly equal portions. This area is slightly pinkish in color and a trifle less dense than the surrounding tissue.

The specimen was fixed in 10 per cent. formalin, dehydrated, cleared and infiltrated with paraffin. Sections were cut, and, after staining by the usual laboratory methods, show the following:

The findings in general are those described in detail in the report upon the specimen removed from the same patient at the first operation (*vide ante*), though the arrangement of the tissues does not so nearly correspond to that of certain typical structures, bronchi, for instance, as in the previous specimen. A small part of the border of some of the sections shows stratified epithelium similar to that of skin, hair follicles, and sebaceous glands, both of which are very rudimentary in type. Other portions of the sections contain small areas of cartilage, in proximity to which are areas of tubules lined by epithelial cells, the latter areas conforming to those of mucous glands. Near these are deep infoldings or tubules lined by columnar epithelial cells bearing distinct cilia. These structures, instead of being placed in proper order to form the histological structure of a bronchus, are scattered indiscriminately in the fibrous tissue which forms the larger part of the sections, none of them, however, being at any considerable distance from the others. Certain parts of the sections contain striated muscle which shows chronic productive interstitial change and atrophy of the fibers.

Diagnosis: Sacral teratoma.

Remarks. This case is evidently a very rare form of teratoma. The notes and drawings have been submitted to Drs. George S. Huntingdon and Francis H. Markoe, of New York, George A. Piersol, of Philadelphia, and to Professor Ballantyne, of Edinburgh, all of whom concur in this opinion. The skiagraphs were more recently obtained, and have not been submitted to the gentlemen named.

As far as I have been able to search, I have not found any case which is precisely similar to it. It seems to be unique by reason of the sinus, which, beginning at the skin, perforated the sacrum and the spinal canal and terminated in the caliber of the rectum, the sinus itself resembling an imperfect trachea or bronchus in structure.

At the time when the child first came under my care, for certain reasons unnecessary to state, I was not able to obtain a skiagraph. Even had I been able to do so, it is doubtful whether it would have been of much assistance, because at two years of age the ossification of the bony structures is so much less advanced than at present. Recently, at six years of age, I have obtained two skiagraphs. Compare these also with Fig. 2. One of the pelvis alone (Fig. 6) shows very well (and, of course, much better in the original skiagraph than in any reproduction), in the middle line, at the level of the letter *A*, the existence of an oval opening in the sacrum. In the original skiagraph this opening shows quite distinctly an upper and a lower portion, with a slight constriction in the middle so that it resembles the figure 8, with the cross line in the middle partially obliterated. There is apparently, also, no bony sacrum below the second or third sacral vertebræ, and no bony coccyx.

When I examined the child's pelvis by the finger in the rectum at the time of the first operation, I did not suspect the absence of bony development in the lower part of the sacrum and coccyx, nor would it have been suggested recently, when I re-examined by rectal touch, except for the finding of the skiagraph. Evidently these bones either still consist of quite firm cartilage or else of fibrous tissue so firm as not to have led me to suspect that it was not bone. The fact that the opening is so long vertically, was not discovered until revealed by the skiagraphs because only the lower part of the opening could be reached by my forefinger. This was engaged by the lower half of the 8, and as I could not reach the upper half of the 8, I did not know that it existed. Even at the recent examination, after I knew the shape and size of this opening, I could not reach its upper portion.

The second skiagraph (Fig. 7) shows this same fibrous tissue, but reveals a second fact of great importance, namely, that the body of the first lumbar vertebra (on a level with 1) is broader

than normal; that of the body of the second (2) is still broader; the body of the third lumbar (3) is nearly twice the breadth of a normal vertebra, and shows a marked tendency toward separation into a right and a left half. The bodies of the fourth and fifth lumbar form a confused mass which is very broad, and about in the center is a light space which apparently marks their irregular but complete division into a right and a left half. Just below this is the oval opening already described in the sacrum. Just below the level of the body of the third lumbar vertebra, and on a level with 4, is a dark shadow, which suggests the possibility of an abortive humerus, forearm, and possibly a hand.

In the light of these skiagraphs, examination of the back showed also this great breadth of the lumbar spine (13 cm. at the level of the iliac crests), so that, as will be observed (Fig. 7), the lumbar spine forms a pyramid, the base of which is apparently at the junction with the iliac bones.

The attempted duplication in the spine and the imperfection of the lower sacrum and coccyx may or may not be indicative of any imperfection or duplication in the pelvic organs. The rectum, we know from repeated examinations, is normal, excepting the fistulous opening, which passed from the rectum through the sacrum, the spinal canal, and the tumor to open just below the centre of the tumor. Whether the vagina, and possibly also the uterus, either or both, are double is uncertain. In so young a child I would not be justified in making any vaginal examination.

I have explained the whole matter to the parents, and advised that when she is fifteen or sixteen years of age, and before the question of possible marriage would arise, she should be re-examined, and if necessary for a thorough examination, she should be etherized. The condition of the vagina and the uterus should be ascertained and the pelvis carefully measured, so that if there is any bar to marriage this should be known and suitable measures taken. Whether the pelvis will develop normally or abnormally and so influence parturition favorably or unfavorably would be of the utmost importance to her future welfare.

Dr. Coplin will discuss the case more fully from the pathological and embryological standpoint. Certainly it is a bigerminal tera-

FIG. 6. — Skiagraph of the pelvis. Showing in the middle line, on a level with *A*, the oval opening in the sacrum, and the apparent absence of the lower sacrum and the coccyx.

Fig. 7.—Skiagraph. Showing the attempted bifurcation of the lumbar spine, and a possible rudimentary arm, on a level with 4, as well as the points noted in Fig. 1. 1, 2, and 3 are placed at the level of the first, second, and third lumbar vertebræ.

toma, the duplicated spine representing the imperfect fusion of the vertebral bodies, while the tumor, with its curious development of the sinus representing an imperfectly developed trachea, or bronchus, and possibly, as shown in Fig. 2, a rudimentary arm, may represent a second ovum.

From the surgical standpoint, there are only two points to be considered: 1. Before operation I was in great doubt whether, in order to obliterate the canal leading from the skin into the lumen of the rectum, it might not be necessary to make a considerable opening in the sacrum, and thus gain direct access to the posterior wall of the rectum for the purpose of inverting the opening in this wall. This would have involved great danger of opening the subdural space, with possible injury to the nerves of the cauda equina.

2. A second method of attack I had considered was the perineal route between the sacrum and rectum, practically a Kraske operation.

Fortunately, I did not have to attempt either of these routes, inasmuch as I found, during the operation, that I could dissect away the entire tumor until it was attached only by the tubular sinus as a pedicle or foot-stalk, and I was able to obliterate the rectal portion of the sinus at the first operation; while the persistent distal portion was removed and obliterated at the second operation. Had I failed, either of the two possible modes of attack above mentioned could have been attempted.

It is now almost three years since the last operation. The child is well developed and healthy. When she walks there is a little waddling gait, due, I presume, to the unusual breadth of the spine and pelvis, or possibly an instability in the lumbar spine. There has never been the slightest trouble from any fecal accumulation in what must still exist—the diverticulum from the lumen of the rectum to the point of obliteration of the tubular sinus at the posterior surface of the sacrum. It is worthy of note, also, that in spite of the large oval opening in the anterior portion of the sacrum there has never been any tendency to the formation of that rare anomaly, an anterior sacral meningocele.*

* Nieberding, Münch. med. Woch., 1904, li, 1384, in an excellent paper, has collected the nine then recorded cases of such an anomaly.

SACROCOCCYGEAL NEOPLASMS. A SUMMARY.
BY DR. COPLIN.

The sacrococcygeal region shares with other parts of the body in the distribution of new growths. To many neoplasms the areas of wide distribution are rare, and the rare tumors of other parts are here more frequent. Of the histoid growths, fibromata, chondromata, osteomata, and lipomata are infrequent; carcinoma and sarcoma, rare; papillomata of various types are probably the most common of the simpler neoplasms involving this region; angeiomata and endotheliomata have been observed. It is not unlikely that the gliomata described have been types of teratoma in which a single element overshadowed other structures. Sebaceous cysts and hygromata, the latter probably of bursal origin, deserve little more than mention.

The important neoplasms of special interest to the practitioner, because of their practical importance, and to the oncologist by reason of their histogenesis, are now conceded to be derived from developmental errors frequently arising early in the evolution of the embryo. Perfect evolution of the tissues embraced in this part of the body is beset by many narrow escapes, and the sharply drawn lines which nature must follow render many and varied deviations so easily possible that it is a wonder that disaster is not of more frequent occurrence. It is in this area that the caudal termination of the primitive streak must most accurately attain its evolution and involution, the neurenteric canal develop and disappear, the anus complete the intestinal tube, the posterior fissure properly close, coccyx and sacrum develop, the inferior extremities symmetrically adapt themselves to the trunk, possibly the caudal appendages of our ancestors bud and disappear, and all of these, and other processes of development, must keep uniform pace, so that none may outstrip another in the relatively rapid growth of all parts involved. Added to these, it must be remembered that in the embryo, within a few millimeters of the area under consideration, is progressing the complicated evolution of the genito-urinary organs, themselves marvels of intricate complexity. Inaccurate coaptation of fissural margins, delayed closure of clefts, ectopia of

fragments, sequestration of cell groups, delayed disappearance of structures that normally atrophy, and inclusion of contiguous elements, are possibilities, any one of which constitutes a deviation from the normal, which, later, during intrauterine life or postnatal existence, may jeopardize the well-being of the individual.

Within recent years few groups of tumors have attracted the attention of investigators more than new growths of the sacrococcygeal region; to review, even briefly, any large part of the literature of the subject would exceed the proper limits of this paper. Borst[1] has summarized the known facts and promulgated theories to 1902, and a little has been added by the more recent communications of Martina,[2] Bartel,[3] Chiari,[4] Féré,[5] Kirmisson and Bize,[6] Tedenat,[7] Graff,[8] and others,[9] all of whom have recorded important observations on the subject. Aside from dermoids due to the inclusion of bits of skin, the all-important feature (oncological) of these studies has been the attempted elucidation of the histogenesis of teratoma. The term "teratoma" is here used in a sense similar to "embryoma," preferred by Wilms and others for similar tumors arising in the ovary. The discussion has been warmest over the questions of the monogerminal or the bigerminal origin of these growths, and here—as is often the case in medicine—confusion has arisen because of inaccurately drawn distinctions rather than essential differences in opinion. Certainly many of these tumors may be considered monogerminal—that is, they have arisen from a single impregnated ovum. Of course, the simpler inclusion dermoids are of such origin, and a like explanation is reasonable for other cysts or neoplastic masses resulting from developmental errors, excessive hyperplasia of one or more elements, ectopia of contiguous tissues, and similar errors in development.

After the discovery of Kowalewsky, Middeldorf sought to explain certain of these tumors as arising from structures forming the neurenterie canal, but such an explanation fails in cases where definite organs, or parts of organs, as limbs partly or wholly formed, nerves, parts of eyes, pulmonary structures, renal tissue, mammæ, bone, etc., are present. Tourneux and Hermann attributed the presence

of nerve tissue intercallated between epithelial and connective-tissue elements to persistence of medullary coccygeal vestige. Borst suggests that brain-like structures may be of this origin. The view that Luschka's body may give rise to sacrococcygeal growths is now abandoned. None of the origins suggested offer an adequate explanation for the presence of definite organs, or demonstrable parts of organs, in such tumors.

I cannot discuss in detail the views of Marchand and of Bonnet as to the possibilities of such tumors arising from impregnated polar bodies or wandering blastomeres. On the assumption that but two polar bodies are present in most vertebrates, the explanation fails in cases like that recorded by Sanger, in which a single ovary contained five embryomata. The preliminary divisional products of ovular segmentation—blastomeres—at a stage prior to the formation of the blastodermic layers must possess potentialities which, theoretically, and according to Bonnet, demonstrably, would be adequate to continued existence and more or less perfect independent development if separated from the original mass. On this theory it becomes possible to conceive that should blastomeres be detached and continue proliferating, they might give rise to a more or less successful attempt at the reproduction of tissues normally developed from properly constituted balstomeres, and in this way give rise to a structure containing the many tissues observed in teratoma. This ingenious explanation of ovarian teratoma—preferably embryomata—has proven very enticing, but falls short of the satisfactory when weighed against the many facts that might be adduced.

The bigerminal* origin of many sacrococcygeal tumors is most in accord with the known facts concerning embryology and neoplastic development. It is the commonly accepted explanation, for duplicated or parasitic monsters include the attachment to or implantation of one fetus upon or within another. This theory places all tumors containing evidence of such highly organized bodies as could best be explained by the assumption that they originated from an impregnated ovum, directly in line with the

* For essentially the same purpose, Ballantyne prefers the terms "monosomatous" and "bisomatous" to the terms "monogerminal" and "bigerminal."

grosser developmental anomalies represented by autosite and parasite. Nearly a half-century ago Virchow maintained the bigerminal origin of such tumors. In the neoplasms the impregnated ovum runs its course of aborted growth within the tissues of the autosite or host; in the other case it is attached to the otherwise more or less perfectly developed child; in one instance it is represented by the neoplasm, in the other by the parasite.

An interesting field of experimentation considered by Féré, Chiari, and also by Lucene and Legros, is the artificial production of tumors of this type by grafting young chick embryos into the cavities or tissues of hens. Space is not available for detailed discussion of their recorded observations, except to say that a certain measure of success has crowned their efforts; after seven weeks, skin with attached feathers has been found in the abdominal cavity, The grafts have developed cartilage and bone, the latter showing epiphyseal formation. Trachea-like structures, and even retinal elements, have been produced. About one year ago, my associate: Dr. Rosenberger, at my suggestion, began a series of experiments along the line indicated. So far the results have not been encouraging; apparently they are negative. We hope, however, to report them in detail in the near future. The question of homologous hen and chick, and other factors that need not be mentioned at this time, renders success largely a matter of accident, but failures, in the presence of recorded results, must not be taken as controverting the reported facts.

In the case reported by Dr. Keen the presence of such highly organized structures as trachea and glands, the separation (duplication?) of the sacral vertebræ and the suggestion of a structure—possibly a limb—shown by the *x*-rays—all point to the bigerminal origin of the growth.

I cannot close without saying something on the question of malignancy. As a rule, these tumors show no tendency to metastasis. Graff, Krukenberg, Montgomery, Czerny, and others have reported dermoids undergoing carcinomatous transformation, but that is something different from a primarily malignant tumor. The earlier writers thought malignancy the rule, and in some cases the microscope has indicated sarcoma; in one instance adenosar-

coma, in another adenocarcinoma. Goldschmidt called his tumor a chondromyxolymphadenosarcoma. While complete removal is highly desirable, Phocas, Cazin, and Broca have shown that it is not absolutely necessary, as imperfect ablation may not be followed by recurrence. Tedenat calls attention to the great danger resulting from injury and infection; of the unoperated cases—when the tumor was present at birth—three-fifths of the children die before the third year. The location favors injury, and slight trauma is often followed by disastrous infection, which in turn, is most difficult to arrest. A sudden enlargement may be due to a mild infection that does not frankly manifest itself, and could easily be taken for excessive neoplastic activity. Hoppe states that in but two recorded cases is metastasis suggested, and his investigation of the reports (Beaston, Frank) leads him to discredit either the diagnosis of the primary tumor or the accuracy of the observer. Stolper, and also Calbet, thinks sacrococcygeal growths intrinsically benign. It is well to remember, however, that undescended testicle, supernumerary mamma, and other abnormalities or ectopias, are not infrequently starting-points for rapidly fatal malignant tumors. Excision is clearly wise. Another important point is the recently established relation between teratoma of the testicle and syncytioma malignum, the dangerous character of which is well known. I have one such specimen, the patient dying in a short time after the appearance of symptoms. Scott and Longcope[11] and Frank[11] also have recorded such cases.

BIBLIOGRAPHY.

1. Börst. Die Lehre v. d. Geschwulst, Wiesbaden, 1902.
2. Martina. Deutsche Zeitschr. f. Chir., 1905, bd. lxxx.
3. Bartel. Wiener klin. Woch., February 25, 1904, p. 213.
4. Chiari. Centralbl. f. allg. Path. u. path. Anat., December 31, 1904, p. 897.
5. Féré. C. R. Soc. de Biol., 1903, tome v, p. 345.
6. Kermisson and Bize. Rev. d'Orthopedie, March 1, 1906, p. 141.
7. Tedenat. Assoc. Francais de Chir., XVI, Congrès, 1903.
8. Graff. Deutsche Zeitschr. f. Chir., 1903, lxiv, p. 526.
9. Lucene and Legros. Bull. de la Soc. Anat. de Paris, 1902, No. 8, p. 764. Engelmann: Arch. f. klin. Chir., 1902, bd. lxxii, h. 4. Winter: Inaug. Diss., Königsberg, 1905. Lissena: Beit. z. path. Anat. u. z. allg. Path., 1902, bd. xxxii. Hoppe: Deutsche Zeitschr. f. Chir., 1903, bd. lxvi. Anspach: Proc. Path. Soc. of Philadelphia, November, 1903, p. 209.
10. Scott and Longcope. Bull. Ayer Clin. Lab. of Penna. Hospital, Jan. 1905, No. 2.
11. Frank. Jour. Amer. Med. Assoc., Jan. 27 and Feb. 3, 1906; full list of other cases.

POINTS IN HOSPITAL MANAGEMENT OF INTEREST TO THE MEDICAL PROFESSION, TO HOSPITAL SUPERINTENDENTS, TO SUPERINTENDENTS OF TRAINING SCHOOLS FOR NURSES AND TO DIRECTORS OF HOSPITALS.[1]

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The development of hospitals within the past fifty years has been so great and the field of activity which they now cover has become so extensive that the problems connected with their construction, general management, and administration are very complex. It is by no means my intention to discuss the many problems connected with the entire subject *in extenso*, but to call your attention to a few points which it seems to me are of special interest at this time to the profession and to those who are interested in hospital management and administration.

Formerly hospitals were largely if not exclusively given over to the care of the poor, and hospital patients as a rule were those who were unable to secure treatment and care in their own homes. Hospital buildings were erected and administered for this purpose alone. They were exceedingly plain and unattractive structures, and their administration was largely upon the lines of almshouses. The attitude of the public toward hospitals was largely that of unwillingness to become hospital patients, on the ground that they were intended for paupers and that admission to such institutions was rather a stigma upon the status of the patient. There was also the conviction that the care of patients in hospitals was very poor, by

[1] Read November 7, 1906.

no means as good as that afforded to patients in their own homes—care including medical service, nursing, diet, and all that goes to ensure the comfort and well-being of the sick. Hospitals were looked upon in somewhat the same manner that lazarettos or pest-houses are still regarded today, as places to be shunned and only to be entered upon compulsion. What a contrast such a state of facts and such an attitude on the part of the public is to that which exists today! Practically all hospitals today in this country, except those maintained by municipalities from the public taxes, make provision not only for the poor who voluntarily seek admission to their wards, but also for the rich and for those in moderate circumstances, in which classes there is no question of charity or pauperism. This part of the work today is purely a business proposition, the hospitals offering a certain grade of room or a bed in pay wards for a definite price per week, the charges made being greater than the cost of maintenance, and the profits arising from the transaction being applied to the maintenance of their charity patients.

The private rooms and pay wards of hospitals are as fully occupied as the free beds in the charity wards, indicating the great change in public sentiment towards hospitals and hospital treatment which has taken place within the past fifty years. This revolutionary change in the character of hospital patients and in the nature of the work of hospitals has come about very gradually and is so universal throughout the country that it is evident the change has grown up in response to a demand upon the part of the public or of the profession, or of both.

This brings up the question as to whether or not it is best for a hospital to care for both the poor in charity wards and for the rich and those in moderate circumstances in pay wards and private rooms. It is quite clear that one class of work is pure charity and appeals to the support of all those among the general public and in the profession who desire to alleviate the suffering and sickness of those who are unable to help themselves. On the other hand, the hospital care of pay patients is purely a business proposition and should be estimated and criticized from a business

standpoint. It is not my intention to do more than raise this question and to allude to some of the factors which have favored development of pay wards.

There is no doubt that members of the profession attached to the staff of hospitals have favored and stimulated the growth of pay wards for private patients. It is a great convenience to the doctor to have as many patients gathered under one roof as is possible, in order to eliminate the time-consuming process of visiting widely scattered patients. The aids to practice also afforded by hospital care in the control of patients and in the exactness with which treatment can be carried out, as contrasted with the treatment of patients in their own homes, have largely influenced the attitude of the hospital doctor toward this question.

The custom has been favored by those in charge of training schools for nurses on the ground that it offers an opportunity to train nurses to care for the rich and those in comfortable circumstances as well as the poor.

The directors of hospitals and those interested in increasing their financial support have looked with favor upon the plan on the ground that the profits from the care of pay patients make it possible for an institution to provide for a larger number of poor patients, and also that a fair percentage of private patients become permanent contributors.

On the other hand, the addition of pay wards to a hospital greatly changes the institution in the nature of its buildings, in its administration, possibly in its staff, and in the cost of its maintenance. The modern hospital which devotes a considerable proportion of its capacity to the care of pay patients more nearly resembles a hotel prepared to cater to the luxurious tastes of the rich than an institution devoted to the care and treatment of the sick. The question is raised also whether money given for the charitable treatment of the poor is properly expended when it is applied to the erection of elaborate buildings for the treatment of the rich, and also whether the greatly increased cost of the maintenance of hospitals of the mixed type does not overbalance the profits arising from the care of pay patients.

Whether it is for the best interests of hospitals established and maintained for the charitable treatment of the poor to continue and to extend the present plan of caring also for pay patients is a serious problem and one which appeals to no element of the general public more than to the medical profession. Whether it is an outgrowth of the policy of maintaining pay patients, or whether it is a manifestation of the luxurious tendencies of the present day, it is a fact that hospital construction has been greatly altered within recent years. The modern hospital has become palatial in character, necessarily expensive in construction, and expensive in maintenance because of the costliness of its fittings and their elaborate character. This tendency at the present time is so marked that it deserves the consideration of all those who have the best interests of hospitals at heart. It seems to me that buildings of the character referred to are not adapted to the business of a hospital. The increased cost of their erection and of their maintenance is a wasteful expenditure of money left for the charitable treatment of the sick poor. The same amount of money would provide for the care of a larger number of patients in buildings of a more suitable character.

The proper training of nurses and the relation of the nurse to the medical profession and to the public are questions of increasing importance. Almost every hospital has its training school for nurses and annually graduates a class to swell the numbers of the graduate nurse. At the present time there is no central supervision over the training of nurses. Each institution is a law unto itself, and as would naturally be expected the character of the training differs greatly in different institutions. The course of training, which formerly was of one year's duration, has been increased in various institutions to two, three, and even four years. There was a general consensus of opinion that a one year's course was insufficient for the proper training of a nurse, but with the increase in the length of the course to three and four years the feeling is growing that at the present time nurses are overtrained. The practice in many training schools is to give nurses a rudimentary medical education; to make them, in other words, "half-

baked" doctors. The result of this system is to lessen their interest in their proper duties and to stimulate their interest, if not their curiosity, in matters purely medical. This method of training cannot possibly increase their capacity for usefulness, but certainly among those who are not gifted with sound judgment and discretion it greatly magnifies their capacity for mischief-making by assuming the relation of physician to their patients.

The training of nurses was instituted in order to supply the profession with efficient assistants in caring for the sick, and the good which has been accomplished in this way is incalculable. Therefore, it behooves the profession to see to it that the training of nurses is conducted upon useful and beneficient lines. There is a growing tendency upon the part of nurses to assert their independence of the medical profession and to assume that it is their right and duty to control the training of nurses and to regulate the right of nurses to practise their calling. This problem is one which calls for careful consideration at the present time, in order that the training of nurses shall be put upon a proper basis and that the regulations governing nurses in the practise of their calling shall be made with due regard to the interests of the public, the profession, and the nurses themselves. An effort was made in the last Legislature of Pennsylvania to pass a bill regulating the training of nurses and providing that only those complying with its requirements shall have the right to designate themselves as "registered nurses." It is not only proper but important that the State should pass a bill regulating the status of nurses, and doubtless an attempt will be made in the next Legislature to secure such a law; therefore, it behooves the profession to consider the matter and to formulate its views so that these can be presented to the next Legislature. The bill before the last Legislature was advocated by certain nurses acting in a more or less representative capacity. The requirements of the bill were very strict and the regulation of the entire matter was placed in the hands of the nurses themselves, which conditions led to sufficient opposition to kill the bill. It is highly desirable that the public should be enabled to know the difference between nurses who have received

a systematic and careful training in hospitals extending over two or three years and those who have taken a six weeks' course of theoretical lectures with little or no practical instruction, or who have studied nursing in a correspondence school. On the other hand, if the requirements to secure the designation "registered nurse" are too great, the tendency will be to raise the cost of the services of the trained nurse to such a point that only the rich can employ her. It is far from my desire to depreciate the value of the services of nurses, but it is a fact that the average citizen is unable to pay the higher prices which the trained nurse of the present day desires to charge. It is my own belief that the present tendency on the part of the training schools of hospitals to require nurses to remain in training longer than two years is a mistake. At the end of two years women of intelligence have been sufficiently trained to carry on their work skilfully and efficiently. It is to the interest of hospitals to require them to stay a third or even a fourth year, as naturally they are more efficient than in their first or second year, but it is very questionable whether it is for the interest either of the nurse or of the general public. If a nurse has given three or four years of gratuitous service in order to secure her training, it is only reasonable that she should demand ample compensation after graduation, in order that she may be repaid for the time spent in the training school. Thus the general public suffers for the benefit of hospitals.

It is well-recognized that education can only bring out what is in the individual and cannot supply natural deficiencies. This is as true of nurse training as of any other variety of education, so that the lengthening of the course of training cannot be justified on the ground that it will result in a higher average of efficiency on the part of graduates. It is sometimes claimed that the three or four years' training is necessary in order that nurses may be trained to become head nurses and superintendents of training schools. Anyone having experience in this matter knows that this must be arranged by a process of selection and that head nurses must be selected from those who have executive ability, which is a natural gift, and not merely from a class having had long training.

Hospitalism is a subject which receives little attention at the present time. It is usually assumed that with modern hospital construction, antiseptic surgery, and trained nursing, hospitalism has ceased to exist. Unhappily this is not true, and every surgeon at least, of experience, knows that he has had wound infection due to hospitalism. An epidemic of mild infections resulting in many suppurations, but fortunately no deaths, stimulated my personal interest in hospitalism, and also led me to discover certain sources of infection in hospitals which heretofore had not been appreciated and which today are commonly disregarded. It is certainly the duty of all those connected with hospital management to use every means for the prevention of hospitalism. The patient who enters a hospital seeking the cure of his disease should not receive surgical infections or otherwise suffer from the baneful consequences of hospitalism.

In the prevention of hospitalism the directors of hospitals perform their duty when they erect well-lighted and well-ventilated buildings supplied with proper apparatus, and when they appoint a qualified staff for the administration of the institution. Beyond this point the duty of preventing hospitalism falls upon the medical staff in providing adequate regulations concerning the isolation of septic patients, the destruction of septic matter, and the proper cleaning and disinfection of the wards and rooms and of the apparatus and surgical dressings used. These regulations are necessarily carried out by the medical staff, the superintendent, and the corps of nurses. The regulations and the practice in most hospitals leave much to be desired. It is not uncommon for septic patients and those having clean wounds to occupy the same ward and perhaps adjacent beds, and sometimes even to be attended by the same nurses. In gynecological practice this plan subjects all wounds of the uterovaginal canal to the risk of infection in the necessary dressing, douching, and catheterizing of these patients; and in other surgical cases in which it is not feasible to make a perfect protective dressing a similar risk of infection is run. The protection of hospital patients from infection requires that septic patients should be segregated in isolating wards or

rooms and looked after by separate nurses, so that they need not be a menace to others.

In nearly all, if not all, hospitals certain apparatus in constant use by nurses is a source of contamination of the nurses' hands with pathogenic micro-organisms. Bed pans and douche pans constantly receive alvine dejections, discharges, douche water etc., all of which contain pathogenic micro-organisms, and yet this apparatus is never or hardly ever disinfected. It is merely washed out, aired, and again used. The result is that every time a nurse handles such apparatus her hands come in contact with active pathogenic micro-organisms, with the result that she may become a source of infection if she dresses wounds, catheterizes patients, or takes part in operations, as it is well-known that hands infected with active micro-organisms cannot be disinfected by the most approved methods in use. The same principles apply to the various articles of furniture in the hospital rooms and wards with which the hands of nurses come in contact. These objects are convenient places upon which pathogenic micro-organisms settle from the air, and unless systematically disinfected the germs may be transferred to the hands of nurses.

I have elsewhere reported a series of mild infections, involving much suppuration but no cases of fatal peritonitis, in which a careful study of the facts showed conclusively that the source of the infections was the apparatus used by nurses and the hands of the nurses themselves. The theory is so fixed in the minds of surgeons that the infection of wounds takes place in the operating room, that the administration of hospitals is today based on this theory, which undoubtedly is largely correct, but which does not take in the whole truth. Briefly, when this series of infections began it was attributed to laxity on the part of someone connected with the operating room staff. The regulations for the disinfection of dressings, instruments, ligatures, and the hands of those taking part in operations, were so changed that twice the usual time was spent in each step of disinfection without improvement in results. A summer's vacation intervened, and in the autumn the infections occurred as before and continued in spite of every effort on the

part of the operating room staff to prevent them. An investigation of the hospital showed that the bath tubs in which patients were bathed, while clean in the domestic sense, were not systematically disinfected before bathing patients; also, that the urinals, bed pans, douche pans, and basins for the toilet of patients were not disinfected but merely washed; also, that the regulations in force for the cleansing and disinfection of the nurses' hands were very inadequate. It seemed to me that these facts offered a probable explanation of the wound infections. Every surgeon of mature years has had the experience in the earlier years of abdominal surgery, before the difficulty of disinfecting the hands was understood, of having had serious or fatal cases of septic peritonitis follow abdominal section when, within twenty-four to forty-eight hours preceding the operation, the surgeon's hands or those of his assistants had been in contact with virulent micro-organisms, such as are found in recent abscesses, puerperal septic infection, etc. It was learned that under these circumstances by no known means could the hands be disinfected within forty-eight to seventy-two hours. Knowing these facts it seemed plausible to me that patients bathed in a bath tub which was septic, by the hands of nurses which were septic, would have deposited upon their body enough active micro-organisms that subsequent efforts at disinfection of the field of operation would prove insufficient to destroy them. While these preparations would destroy most of the germs and inhibit the remainder, so that peritonitis in abdominal operations was escaped, enough germs from the skin adjacent to the wounds would be introduced in the wounds during the operative manipulations to cause late suppuration.

Efficient regulations for the disinfection of nurses' hands and for the disinfection of all apparatus employed by nurses were at once instituted, and the regulations originally in force in the operating room were again followed; that is, the time used in disinfection was cut in half. Immediately the series of infections was at an end.

This experience led me to consider the wisdom of the practise in common use in hospitals with reference to the maintenance

of an aseptic technique on the part of nurses. This technique depends upon the views of the head nurse in charge, modified by verbal instructions or suggestions made by the staff, modified again from time to time by subsequent suggestions or instructions, the result depending upon the accuracy of the head nurse's memory and her ability in giving accurate verbal instructions to nurses in training. The many chances for error and inaccuracy in this system were at once apparent, as was the desirability of adopting a definite technique, which should be printed so that it could be taught by the head nurse and learned accurately by pupil nurses. With the assistance of the medical staff at the Kensington Hospital for Women and with the suggestions and criticisms of three different head nurses, a technique was compiled which has been used with great satisfaction to all concerned during the past two years. This seems to me such an improvement upon the methods heretofore in use, that I heartily recommend it to other hospital surgeons.

DISCUSSION.

Dr. Wharton Sinkler: I am glad to hear what has been said in regard to the overtrained nurse, and it strikes me as both timely and true. I have felt, for many years, that there has been a growing tendency to overeducate nurses in medical matters and to attempt to give them a course of instruction which is more suitable for medical students in their second or third year. The lengthening of the time that a nurse is required to remain in a hospital I have always felt to be of very doubtful advantage. One of the great disadvantages of the present system of training is, as Dr. Noble has said, that of making the nurse value her services so highly that the price she puts upon them precludes any but the wealthy employing her. We have met this tendency at the Directory for Nurses and it is a growing difficulty. Very few nurses are willing to begin with anything like a reasonable salary, $15 per week being regarded by most of them as insufficient pay and not at all commensurate with their value. They are usually persuaded that it is the wisest policy for them to begin with $15 a week, because in that way they will get more work and then have the opportunity to show the value of their services. After the first year, however, the nurse usually sends a communication that she wishes to raise her price from $15 per week to $20 and $25, and later she wishes to raise it to $30. This makes it very difficult for the Directory to supply nurses to people

in moderate circumstances. If the proposed act becomes a law, so that to become a registered nurse a three years' course of instruction shall be necessary, all the training schools will be forced to lengthen their course to three years. In that event, nurses will be kept in the hospitals a year longer than is actually requisite. That seems to be one of several objections to the new registration act which is to be very strongly pushed at the next Legislature.

Dr. John K. Mitchell: One aspect of the question of overtraining nurses has struck me—and that is, that frequently the nurse who has spent three or four years in a hospital has lost rather than gained by the extra training. For all the most useful purposes of a nurse a two years' course is sufficient. If a woman cannot learn the business in that time she never will learn it, and if she needs more time to acquire it she is not fit to be a nurse.

Moreover, if pupils are kept too long in a hospital under strict routine and discipline, they become unable to face any unusual situation or go in any way out of the beaten path. They have learned not to depend on their intelligence, but to turn for everything to the head nurse. In consequence of this, one often finds that for mental patients, whose cases present unexpected complications, a nurse, even an untrained or half-trained one, who has managed to retain originality of mind and the power to think for herself, will do better work than an overtrained nurse who has been drilled and drilled until she is no more use in a new situation than a machine would be.

Dr. W. M. L. Coplin: I think New York has made an advance in regard to the trained nurse. Their system is not to have the qualification of registered nurse, but to have a definite curriculum for a definite period of time in their training schools. The training school with an ambition to retain its record is likely to weed out such nurses as will fail in the State board examination, rather than allow them to take the examination.

My own conviction, in regard to length of the course, is that two years is quite adequate. The proper administration of the school itself is an important problem. The elaborate series of lectures proposed to be given in the training schools entails, in my opinion, a waste of energy, and the method tends to give those in training an idea that they possess very much more learning than is actually the case.

There have recently arisen institutions giving a course of training of from six weeks to three months, ending in the issuance of an elaborate certificate. They are required to work three days in each week, from 11 until 3, and then given lessons to prepare at home, and subsequently receive superficial instruction in dispensaries by those unfamiliar with the training of nurses. Graduates of these short-term courses are at present competing for positions as nurses in the public schools.

In the New York system certificates are given to the training schools by the University, and if their graduates are not qualified the certificates are recalled.

Dr. Walter G. Elmer: In regard to the advisability of shortening the term in the training school to two years, the question is, whether this would work out well in practice. We learn to depend upon our nurses and trust them for their efficiency. They are expected to recognize certain conditions which we do not see, because we cannot be with the patient throughout the entire day. The physician sees the patient for five to ten minutes, and there are times when the patient will develop symptoms which the nurse should be able to recognize. The work in the training school is hard and the hours long, If a nurse attends one lecture a week and attends to her duties in the school. she is doing about as much as we can expect of her. By devoting one year to one lecture a week in anatomy, and the next year to materia medica, the nurse can in three years acquire considerable knowledge. We know of instances in which the nurse has corrected mistakes in prescriptions which might have been serious if carried out. One of the greatest difficulties is in teaching nurses their work in the operating room. It has been shown that nurses in the hospital for only a year are not trustworthy in this respect. In their endeavor to do their best, they may, through their ignorance, contribute to fatal results. This is because they are put in positions for which they are not properly taught. The nurse who is thoroughly trained, and who is reliable, we may send to the house to prepare for an operation and know that every detail will be performed with accuracy. There is always a demand for such nurses and there should be such nurses upon whom we can depend.

I think it can be shown that the hospital management, in the matter of training schools, is not keeping the nurse in training for its own ends, but that in a three years' course they turn out nurses better qualified to do the work we expect of them.

Dr. Noble closes: I feel that, so far as the nurse training question is concerned, there is no doubt that the bill is going to come up. Therefore, if the medical profession has any views upon the subject it is highly desirable that they should be formulated, in order that they may be presented in proper form to the Legislature. So far as I know, the medical profession is paying no attention to the subject.

THE MAKING OF A MUSEUM OF APPLIED ANATOMY.[1]

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In the teaching of applied anatomy the subjects discussed can usually be illustrated by preparations made from the cadaver. As to the desirability of well illustrating such a course by anatomical preparations there can be no question, but the extent to which this is carried depends not only on the ingenuity of the teacher, but especially on the facilities and time at his disposal.

One set of preparations is necessary for the use of the teacher in giving the demonstrations, but it is in the highest degree desirable that a duplicate collection be made, suitably mounted, and so displayed as to be freely accessible to the students, so that they can consult and study them at their leisure.

As museums of applied anatomy are as yet in an embryonic stage, it will only be by an exchange of individual experiences that we will be enabled to decide: first, what kind of preparations are desirable; second, how shall they be made, and third, how shall they be preserved. To those who have had experience in making museum preparations the task will be somewhat lightened, but many of those desiring these working museums will have had almost no such experience, and, to them, even elementary methods and procedures will be of benefit. While ordinary anatomical and pathological museums are to be found in all teaching institutions, I know of no museum in which the preparations have been made with the object of especially illustrating the application of

[1] Read November 7, 1906.

anatomy to the explanation of the functions of the body in health and disease, of the causes and results of disease and injuries and their treatment.

What Kind of Preparations are Desirable? The preparations fall naturally into two classes: one illustrating the normal topography of a part, and the other the affections to which it is subject. Topographical anatomy is inseparable from applied anatomy, and the museum should contain as many specimens as possible illustrating it. The following will serve as suggestions:

The skull and brain can be readily illustrated. The triangles of the neck; anterior view of the structure of the neck; the organs of the thorax and abdomen; the axilla, bend of elbow, forearm, palm of hand, region of Scarpa's triangle, Hunter's canal, popliteal space, front and back of leg, dorsum of foot, sole of foot, arches of foot, etc.

In some cases other preparations will be of service, such as ligamentous preparations of the joints, to explain their action. Also muscular preparations to explain the construction of the limbs, etc. Special preparations illustrative and explanatory of the various affections should be made to an extent far greater than is as yet prevalent.

Skulls can be prepared illustrative of cerebral localization and showing the sites of operative procedures. The bones can be removed, showing the position of the arteries and venous sinuses. The membranes can be removed, showing the location of the fissures, etc. Brain preparations may be made, illustrating the effects of apoplexy, cerebral softening, the course of sight (as in the production of hemianopsia), and other brain lesions.

The mode of access to the various air sinuses, of reaching Meckel's and the Gasserian ganglions, catheterization of the Eustachian tubes, and rhinoscopy and laryngoscopy can be illustrated, also operations on the turbinated bones. In the neck, preparations may illustrate the ligations of arteries and operations on the air passages and thyroid gland; in the chest and abdomen it is mainly a question of topography, but it is instructive to dilate the lungs and pericardium. As yet the operations on the chest are comparatively

few, but those on the abdomen are legion. Special preparations, illustrative of operations and mode of obtaining access to the bile passages, gastroenterotomy, appendicitis, kidneys and female genital organs, all can be illustrated. Hernia is another field. In the extremities, fractures and luxations can almost all be artificially produced, and preparations made illustrating their pathology and treatment. Amputations, ligations of arteries, resections, and palmar and plantar abscesses can all be illustrated; as well as other operations, such as the mode of access to the hip-joint and knee-joint, etc. As can be seen, the field is limitless and the above list is by no means intended to be complete.

How Are the Preparations to be Made? In the making of preparations intended to illustrate the topography of a part two methods may be employed. One consists in the dissection of a subject injected with a 10 per cent. solution of formaldehyde. This method is particularly valuable for preparations of the viscera, and may be combined with freezing when transverse sections are desired. Occasionally it is of service in the extremities, but the tissues are so hardened and bleached and the fibrous tissues and fasciæ are so dense that the identification of individual structures is extremely difficult and sometimes impossible. The other and more generally useful method consists in injecting with an ordinary non-hardening preserving fluid, and then making the desired dissection, taking care to disturb the normal relations of the structures as little as possible. On the completion of the dissection any structures which have been disturbed are to be carefully replaced in their previous position and the specimen immersed in a solution of formaldehyde, and there allowed to remain until the specimen is thoroughly hardened. After being set by the formaldedyde the specimen can then be either kept in a tank with some preservative fluid and used for demonstrations in teaching or preserved in a museum. The coloring of the arteries red, the veins blue, and the nerves yellow, with ordinary water-colors. will add to the attractiveness of the specimen and enable the various structures to be more readily identified. In some cases pathological conditions can be utilized, such as empyema or

pleurisy, illustrating displacements of the thoracic organs, also enlargements of the liver, stomach, hernias, hydrocele, etc.

To illustrate joint lesions the various joints can be injected with paraffin or wax tempered with tallow. This can best be done by immersing the joint, deprived of its skin covering, in a basin of hot water. The melted wax is then injected through an aspirating needle into the joint by means of a syringe. After the wax has hardened the part is dissected as desired. In this manner wax injections of all the joints can be made. In the same way the sheaths of the tendons of the flexors of the fingers and the extensors on the back of the wrist can be demonstrated, the wax being colored with vermilion or Prussian or ultramarine blue if desired.

To illustrate the effects of plantar and palmar abscesses colored wax can be injected beneath the fasciæ.

In making preparations illustrative of fractures it is usually better to first dissect and expose the parts to the extent desired and then make the fractures. In some cases, however, the fracture can be first made and then the dissection completed. In fracture preparations the muscles are the most important structures, as it is usually the influence which they exert in producing displacements that it is desired to illustrate and explain, and in such cases it is best to remove all other structures. The preparations desired for use in demonstrations should remain soft, and are to be kept in tanks with some antiseptic fluid which prevents the growth of moulds, such as thymol or carbolic acid, to which a small amount of formaldehyde is to be added as well as a small amount of glycerin. Too much formaldehyde will harden the specimens and is to be avoided. Glycerin tends to keep them pliable.

To be of service the fractures have to be made in certain definite directions. This is accomplished by first weakening the bone by perforating it with a drill, or nicking it with a chisel, and then completing the fracture by manual or instrumental force. By these means quite satisfactory preparations illustrative of fractures of the jaw, surgical neck of the humerus, clavicle, elbow, radius, femur, tibia and fibula, etc., can be produced.

In the preparations of luxations these are practically all pro-

duced by hyperextension, often assisted by a thrust or twist. The lower jaw is to be pried open as widely as possible, and if it cannot be luxated by pushing the condyle forward, it may be accomplished by a blow with a mallet, a small block of wood intervening.

The shoulder can be luxated by having the body firmly bound or held to the table, while the arm is hyperabducted, using the acromion process as a fulcrum. Sometimes a twist is necessary to further loosen the capsule, and then a push sends the head in the subcoracoid position.

The elbow can be luxated by holding the arm flat on its posterior surface on a table and then hyperextending the elbow over the edge. Sometimes a supra-condylar fracture may result.

The thumb may likewise be dislocated at its metacarpo-phalangeal joint by simply bending it sufficiently far backward.

The hip necessitates having the pelvis firmly bound to the table by bandages, and the aid of assistants; the thigh is then hyperabducted and internally rotated. The rent in the capsule is started by the powerful hyperabduction, and the internal rotation enlarges it and sends the head out of the socket posteriorly. This dorsal luxation, by flexion and external rotation, can then be transformed into a thyroid or pubic luxation.

Luxation outward of the ankle is produced by resting the lower third of the leg on a block, and allowing the foot and lower end of the fibula to project. The upper (internal) surface is then struck a powerful blow with a heavy mallet, a thick cloth intervening, and a Pott's fracture with external luxation results.

In order to avoid the occurrence of fractures of the humerus and femur, in producing luxations, it is desirable to grasp them as close to the joint as possible, and rupture the capsule by a gradually increasing pressure. Sudden, spasmodic efforts favor the production of fractures. Most useful teaching specimens can be made by first luxating a joint and then removing all except the bones and ligaments.

There is no need to discuss the preparation of specimens illustrating the ligation of arteries, amputations, resections, special operations, etc., as the methods of so doing are sufficiently evident.

How Are the Preparations to be Preserved? The quality of a museum will naturally depend on the ability of the preparer and the time and facilities at his command. Museums are not infrequently storehouses, whose contents are but rarely disturbed and only occasionally consulted. The museum we are now discussing is to be for use, not show; it is intended to be a study museum primarily for students, to assist them in their course in applied anatomy. Secondarily, it may sometimes be consulted by graduates who are interested in special lines of work. Physicians and surgeons, not infrequently, desire to ascertain the relations of the viscera or the topography of parts involved in operations.

Different preparations require various sorts of containers. Small specimens can be satisfactorily preserved and exhibited in glass jars. The kind of jar will, in some cases at least, be governed by the amount of money available. The cheaper round ones often answer the purpose sufficiently well; but, where expense does not prohibit, the imported jars with flat sides and clear glass are of course to be preferred. The covers should be easily removable and not sealed tight. The round jars are usually provided with a glass top and rubber ring. The flat jars are covered with a flat plate-glass cover, resting on the ground edge, previously smeared with a little cosmoline. It is almost essential that all containers should be so covered as to be easily accessible, so that the preparation can be removed, examined, repaired, or even replaced by a better one at will. For the majority of the specimens a flat container is preferable, and the most desirable I know of are the porcelain anatomical basins made by John Ford & Co., of the Holywood Glass Works, Edinburgh, Scotland. These are made in several different sizes and shapes and have plate-glass covers. They have proven to be more desirable than the porcelain of domestic manufacture, and can be obtained for a very reasonable price as, for teaching institutions, they are admitted duty free.

The porcelain-lined iron tanks, to be obtained from dealers in plumbers' supplies, can also be used, but are not so satisfactory. If used, care must be taken to see that the rim is level so that the

plate-glass cover rests even. The slightest chip in the enamel is followed by the formation of rust. Large tanks can be made of wood. They are difficult to make watertight, usually requiring coating inside with pitch or some other waterproofing substance. Lead linings or paints are to be avoided, as that metal is readily attacked by the chemicals present, and is apt to deposit a white substance on the preparation, which speedily ruins it.

The porcelain basins have commonly had their glass covers sealed on by means of a paste, composed of white or red lead and gold size. This was the method we first adopted and it was a complete failure. The greatest difficulty was experienced in getting the glass to adhere firmly to the porcelain. When this had been accomplished, the extremes of temperature caused the glass covers and even the porcelain basins themselves to crack. The method was so unsatisfactory that it was abandoned. Attempts to clamp the covers down on rubber gaskets by means of metal clamps were likewise unsuccessful. It was then decided to lay the cover on without sealing, and at the suggestion of Prof. Marshall the preserving liquid was overlaid with oil to prevent evaporation. The best oil for the purpose was a colorless, heavy petroleum, sold by the trade under the name oleum petrea. This was partly satisfactory, but it became discolored and its renewal was expensive.

Trial was made of a 50 per cent. aqueous solution of glycerine; this was sufficiently hygroscopic to prevent troublesome condensation on the under surface of the glass, but it also became discolored, and its renewal was too expensive, and it made the specimens (muscles and viscera) too dark. Finally, commercial, 95 per cent. alcohol was tried and has been found to be the most satisfactory of all.

The method now preferred is to put the specimen, as soon as it is made, in either 10 per cent. solution (approximately) of formaldehyde and allowing it to remain several days, or No. 1 Kaiserling solution. From this it is put into pure 95 per cent. alcohol and then into the basins. The glass covers are simply laid on, and if desired finished with a rim of white enamel paint. The specimens

are not imbedded, but sufficient plaster-of-Paris is placed in the basins to form a hard flat base. On this the specimen is laid. The under surface of the specimen is to be cut away until it is level and of the desired height. Flat plates of slate can be used instead of the plaster if preferred. By this manner of preservation, the preparations can be removed at any time by displacing the lid and lifting the specimen from the alcohol. If the latter is discolored, it can be poured out and the plaster cleansed. The preparation can then be repainted or repaired, replaced in the basin, re-covered with clean alcohol, and the lid again laid on.

It might be objected that the specimens being so easily accessible would be disturbed by the students, but such has not been our experience.

The extent to which the alcohol becomes discolored will depend on the character of the specimen (muscular tissue and the viscera favoring it) and the length of time the specimen has been in formaldehyde. The alcohol will, of course, dissolve fat out of the specimen, but when this has been removed it will remain clear. When much fat is in the solution it will form a precipitate, especially in cold weather.

Water colors are used to paint the vessels, nerves, etc. Vermilion for the arteries is quite permanent; blue for the veins is less so; yellow for the nerves is fairly satisfactory; zinc white is not at all stable; green is suitable for the biliary passages, salivary ducts, etc. Owing to the easy access, repainting some of the specimens at the end of the session is not a formidable task.

An explanatory card or book is attached to each specimen.

It is recognized that these methods are not ideal; but they place it within the power of a teacher of limited means to obtain what so many desire, viz., a working or study museum to illustrate his course.

DISCUSSION.

Dr. W. M. L. Coplin: One of the best methods I have seen for preparing illustrations of morbid anatomy is that of freezing the structure, sawing sections, and while still frozen the surface is planed and the section placed upon thick glass in a thin layer of gelatin. By the use of suitable paper laid on the glass, students have no difficulty in tracing the different structures exhibited by the preparation. Sections can be made through the thorax, abdomen, or pelvis, showing any abnormal condition. One of the best sections I have ever seen was made in two planes, showing the relation of an abscess of the brain to disease of the middle ear and mastoid. A vertical section showed the position of the mastoid lesion and a transverse section its relation to the abscess. Both relations could be traced and exhibited on the same sheet. The old method of making transverse sections of the body for showing the relations is more or less imperfect, for in a little while the parts are jostled out of relation. I think the gelatin plate offers the best solution of the problem of permanency of these transverse sections.

Dr. Davis closes: I simply wanted in this demonstration to suggest a method by which the teacher with very moderate facilities could provide himself with a working museum. The porcelain basins have been made for many years, but, so far as I know, nobody has discovered yet a satisfactory way of fixing the glass plate down to the porcelain, and if it is fixed down permanently one cannot get access to the specimen, which is desirable because it usually is only a question of time until the colors fade or the specimen becomes disarranged in some manner. At the end of the session any of those which are discolored can have the alcohol drained off and replaced.

ADAMS-STOKES DISEASE (HEART-BLOCK) DUE TO A GUMMA IN THE INTERVENTRICULAR SEPTUM.*

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The condition at present recognized as the Adams-Stokes syndrome was first described by Adams[1] in 1827, and more fully studied by Stokes[2] in 1846. Since that time many cases have been reported and studied, but until very recently no really convincing demonstration of the etiology and pathological basis of the condition had appeared. Thus, Charcot held that the lesion was to be found in the medulla; Stokes himself suggested the heart muscle; Huchard[3] held that the circulatory mechanism of the heart, together with disease of the cerebral vessels, should be held accountable; Gibson[4] and Jacquet[5] called attention to a certain similarity with intermittent claudication; and others have ascribed the condition to fatty degeneration of the heart, to tumors of the vagus, or to pressure upon the pneumogastric nerve. Gaskell[6] was the first to demonstrate the

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fact that, in tortoises, constriction of the circular layer of muscle at the auriculoventricular junction inhibits the normal rhythm of the heart, so that the auricles and ventricles beat independently of each other. Chauveau,[7] Vaquez and Bureau,[8] and Moritz[9] have contributed interesting articles dealing with the dissociation of the auricles and the ventricles.

To Erlanger[10] belongs the credit of first suggesting that the lesion of Adams-Stokes disease lay in the bundle of His, and of offering incontestable experimental evidence supporting his belief. In 1905 Stengel[11] made a preliminary report of a case of Adams-Stokes disease in which the autopsy disclosed macroscopically an atheromatous lesion on "the anterior mitral leaflet toward its base and aortic edge," being, therefore, in the region "exactly over the bundle of His where this band passes from the ventricle to the auricle." Thus far there has been no report of the microscopic findings, so that it is still uncertain whether there was actual involvement of the bundle, although there is strong presumptive evidence that such was the case.

For many years an active discussion has been carried on by physiologists as to the cause of the rhythmic activity of the heart One school—the followers of the myogenic theory—has held that the heart muscle itself possesses an inherent automaticity, which is influenced by, but not dependent upon, the nervous mechanism. The other school took the opposite view, namely, that the nerves and ganglia are of primary importance. Long ago the fact was pointed out that contractions occur in the fœtal heart before its nervous structures are developed, and this has tended to support the myogenic theory.[12]

It has been demonstrated by the experiments of Gaskell, His, Tigerstedt, and Erlanger that the symptoms of Adams-Stokes disease and those of heart-block, brought about by injury to the bundle of His, are very similar. Erlanger, by an ingenious clamp screw applied to the muscular bundle, was able to bring about a gradual failure of conductivity from auricle to ventricle. When slight pressure was made the ventricle would miss every fourth auricular stimulus; when the pressure was further increased,

the ratio would fall from 1 to 3 to 1 to 2, and finally complete dissociation of the rhythm would occur. In other words, a condition of complete heart-block had occurred, and the ventricle setting up a rhythm of its own contracted entirely independently of the auricle. "With each change in rhythm the blood pressure was much affected, falling with the fall of the ventricular rate and rising with its increase. But even in complete block a fair pressure might be maintained. With partial block both auricle and ventricle might be inhibited by stimulation of the vagus as easily as under normal conditions. But when the block was complete no diminution, or only a slight diminution, of the rate of the ventricle resulted from stimulation of the vagus. The auricles reacted normally to vagus stimulation. Section of both vagi had little or no influence on the rate of the ventricular beat when the block was complete. But stimulation of the accelerator nerve usually increased the rate of the ventricle. The reaction of the auricles to stimulation of the accelerator nerve was not influenced by the block."

In mammalia the muscular structure of the auricle is separated from that of the ventricle by a layer of connective tissue. In order to substantiate the contention of the upholders of the myogenic theory of cardiac rhythmicity it was essential that some bridge of connecting muscular tissue be demonstrated. This was accomplished by W. His, Jr.,[13] and by Stanley[14] independently of each other. But His was the first to succeed in sectioning this muscular bundle, and bring about a dissociation of the auricular and ventricular rhythm.

Owing to the meager character of His' preliminary publications, which appeared in 1893, the subject attracted little attention until 1904, when the existence of the bundle, its physiological properties, and its exact anatomy were confirmed through the researches of Retzer,[15] Breunig,[16] Humblet,[17] and Hering.[18]

The structure which is now known as the bundle of His consists of a narrow band of fibers 18 mm. in length, 2.5 mm. in width, and 1.5 mm. in thickness, extending from the right auricle and its valves to the interventricular septum.

More recently the structure has been carefully studied by Keith[19]

and Tawara.[20] The latter has given a developmental as well as an anatomical description of it. According to him the "bundle of fibers passes forward from the coronary sinus through the interauricular septum to the central fibrous body of the heart, on which it forms a plexus. One of the bundles from this plexus breaks through the fibrous body into the interventricular septum and is distributed subendocardially on the right and the left sides of the latter. The auricular part of the bundle is made up of very fine, richly nucleated fibers, and the fibers of the ventricular part belong to the Purkinje type."[21]

Still further corroboration of the auriculoventricular dissociation which occurs in Adams-Stokes disease has been furnished by Gibson,[22] who has studied the electromotive changes in a case of heart-block by means of Waller's apparatus. By this method the electric variations are indicated by means of a Lippmann capillary electrometer. "Leading off from the basal region of the precordium to the acid, and from the apical region to the mercury, the usual diphasic movements of the capillary column were clearly seen preceding the apex-beat, and evidently resulting from the ventricular systole. But in the interval between these waves other smaller waves were distinctly seen, and can be attributed only to the systole of the auricle."

The electromotive changes have also been most carefully studied by Einthoven,[23] on a still more elaborate scale. Curiously enough the recording instrument was placed in the physiological laboratory while the patient remained in the hospital. The pulsations were transmitted by means of wires. "He employed a specially arranged galvanometer, the movements of which were recorded on a travelling photographic plate, on which two ordinates and abscissæ, representing electric potential and fractions of a second respectively, were simultaneously recorded." In making tracings for a case of heart-block he was able to demonstrate complete dissociation of the auricular and ventricular oscillations. This method, while obviously impractical in a clinical study of cases, owing to the fact that in addition to a complicated apparatus trained observers with a special knowledge of physics are necessitated, nevertheless presents

very accurate and interesting corroboration of other recent investigation.

Symptoms. The cardinal symptoms of Adams-Stokes disease consist of (1) bradycardia, (2) cerebral attacks, and (3) pulsation of the cervical veins, exceeding in rate the arterial pulsation.

The Pulse. In most cases the pulse is habitually slow, sometimes reaching 30 or 20 beats per minute. Often the rate bears a definite relation to that which was normal for the individual in question. Thus, it may be one-half or one-quarter as fast. This is due to the fact that only every other or every second stimulus is able to cross the bundle of His. The arterial pulse is generally regular in rhythm, although arrhythmia is not uncommon. During the acute attacks the ventricular contractions may fall as low as 10, 8, or even 3 beats per minute. Kidd[24] and Laslett[25] found a condition of asystole lasting sixty and ninety seconds respectively. In Stengel's case an interval of two minutes and ten seconds was noted. If the heart is auscultated during these periods one may hear feeble and muffled contractions. These have given rise on the part of some authors to the belief that the sounds are due to abortive systoles, too weak to make themselves felt at the wrist. The most generally accepted opinion, however, is that they are due to contraction of the auricles, a condition which, as Gibson and Mallet[26] have long since shown, does produce a definite sound. When simultaneous tracings of the arterial and the venous pulses have been made it has nearly always been possible to prove definitely the etiological agency of the auricle. At times it is also possible to *see* that the jugular pulsation in the neck is synchronous with the doubtful sounds. Maynard's[27] contention, based upon two cases with radial tracings only, that the accessory heart sounds were due to hemisystole, and not to the contraction of the auricles, is not convincing.

The slow pulse in Adams-Stokes disease is due to depression of conductivity in the auriculoventricular bundle. The auricles contract more or less normally, but the ventricle only responds to every other, every second, or every third stimulus. Just upon what the exacerbations of bradycardia depend still is uncertain.

Norfleet[28] has reported a case of Adams-Stokes disease occurring in a man of sixty-nine years, who for over a year had a pulse-rate of 45 or less per minute. With exacerbations of the bradycardia there were convulsive movements. During these attacks the pulse-rate sometimes remained as low as 8 or 9 per minute for periods of twenty-four hours.

The cerebral symptoms consist of attacks of weakness, vertigo, unconsciousness, occasionally convulsive seizures, and at times Cheyne-Stokes respiration. The patient may have an uneasy feeling about the heart, becomes pale, and promptly falls unconscious, being practically pulseless at the wrist, and soon breaks out in a clammy sweat, consciousness returning gradually. The attacks may last from a few seconds to several minutes, they may be repeated at varying intervals, and anyone of them may end fatally. Upon returning to consciousness the patient often states that he had a nightmare—thought he was dying.

Occasionally attacks like those just described alternate with simple vertigo, but some cases present certain features which closely resemble apoplexy, the patient falling rapidly into a deep coma, with flushed face and stertorous breathing. In one of Osler's[29] cases there was transient motor aphasia. Actual convulsions, as happened in our case, may also occur. When present they are mainly limited to the face and hands, although general epileptiform attacks are not unknown.

In some cases the initial pallor of the face may be replaced by congestion. In our case this was a very noticeable feature. A sensation of blood rushing to the head was a marked symptom in Leuchtweis' case. The convulsive attacks occurring in Adams-Stokes disease are probably the result of cerebral anemia. They are apparently similar to those produced experimentally in animals by severe hemorrhage. The apoplectiform symptoms may reasonably be assumed to be due to venous congestion of the brain, a condition which has long been known clinically to be associated with bradypnœa, paresis of the glottis, and spasmodic conditions.

The belief held by Tripier[30] that the convulsive attacks preceded and were the cause of the bradycardia has been definitely disproved by Webster's[31] tracings.

Some cases exhibited features common to other cardiac disorders, such as nocturnal asthma, precordial oppression, pallor, sudation, and dyspnœa.

The case that we report herewith is of very considerable interest: It presented all the cardinal symptoms of Adams-Stokes disease; sphygmographic tracings taken coincidently from the jugular vein, the radial pulse, and the apex beat showed the incoordination of the auricles and ventricles, the former contracting more often than the latter; and at autopsy a growth was found involving the auriculoventricular bundle, which on microscopic examination proved to be a gumma.

According to His, Jr.,[32] dissociation of the auricles and ventricles might be brought about by any one of three conditions: (1) Degeneration of the myocardium of sufficient extent to interfere with conductivity; (2) dromotropic nerve influences—inhibitory impulses—conveyed principally through the agency of the pneumogastric; and (3) localized disease of the auriculoventricular bundle. As the microscopic examination shows, our case belonged to the last named category.

E. B., white, male, aged thirty years, a native of Ireland, was admitted to the Philadelphia General Hospital May 20, 1906, complaining of vertigo and syncopal attacks.

Family History. Father died from accident; mother from senility, aged ninety years. Mother had seven children; with the exception of one who died of pertussis at four years, all are living and well.

Personal History. Previous illnesses: Pertussis, mumps, scarlatina, and diphtheria in childhood. Typhoid fever in 1895, lasting two months (including a relapse). Ever since then he has had a trifling but persistent cough. The patient was brought up in the country until he was fourteen years of age, at which time he secured employment in a hardware store. At eighteen years he enlisted for three years in the British army. Afterward he spent eleven years frequently changing his occupation, having for a time been a barkeeper. He then again enlisted, serving in Cairo, India, and seeing actual service in the Boer war. During the last two years he has been a waiter. He has indulged in occasional alcoholic intoxication,

but this was exceptional; he has used tobacco to excess. In 1893, he contracted a "chancroid" of the penis, which appeared eight days after intercourse, and lasted eleven days. He received only local treatment. The sores were multiple, he never developed any rash or constitutional symptoms. He has been married two years. His wife has borne two healthy children, and has never had any miscarriages. He has never had any gastrointestinal or renal symptoms.

Present illness began on May 16, four days before admission, when while riding in an electric car asleep, he had an attack of syncope. He woke to consciousness to find the other passengers looking over him. During the attack he had fallen from his seat. He describes the onset of the attack as beginning with the sensation that blood was rushing to his head, associated with some vertigo which increased. This phase of the attack was very brief, and he was unable to state whether objects seemed to whirl about him, or he about them. He had two similar attacks subsequently on the same day, and on the following day two or three more. He had three attacks on the 18th, and on the 19th had an attack about 1 A.M., while in bed, after a hard day's work. On the day of admission he had attacks every ten or twenty minutes throughout the day.

Physical Examination. The patient is well-developed and nourished. The pupils are equal, and react promptly to light and distance. The ocular movements are normal; the tongue is fairly clean. The chest is well-formed; the expansion equal and of normal extent. The lungs are resonant and clear throughout. The extremities are negative except for decided downward curvation of the finger-nails, and a scar on the right knee, resulting from a former bullet wound.

In the *recumbent posture* the cardiac dulness extends from the right sternal border, and the upper border of the third rib, to the midclavicular line. The apex-beat is fairly diffuse, and is visible and palpable in the fifth interspace. The radial pulses are equal and synchronous. The blood pressure is low—systolic 117 mm. Hg. (Stanton), diastolic 85 mm. There is marked pulsation of the veins of the neck, the rate being about three times as rapid as

that of the radial pulse. This pulsation is direct (not transmitted from the carotid) and is slightly arrhythmic. The first sound at the apex is feeble, and it is followed after a fraction of a second by a second sound, apparently muscular in character, which can be clearly differentiated from the normal second sound of the heart, which follows it, and may be heard over the entire precordium. There is a systolic murmur at the apex, which is transmitted toward the axilla, but not to the angle of the scapula. The ventricular beats are all felt at the wrist. The pulse rate is 48.

In the *sitting posture* the heart sounds become louder, the systolic murmur is more intense, and the irregularity more marked. The radial pulse-rate is unaffected by the change in posture, still remaining 48. The liver can be palpated at the level of the umbilicus.

May 24. The patient has had three attacks since admission, until today, when they have become more frequent, occurring about once every half to three-quarters of an hour. The attacks begin with a sense of fulness of the head, vertigo, and end in syncope; and last altogether about five seconds. In one attack he had twitching of the facial muscles.

May 23. *Ocular examination,* by Dr. Hansell. There is a most unusual condition of the vessels of the right disk. The artery superficial to the vein is distended in an angular shape, and communicates with the large underlying vein by a broad channel—arteriovenous aneurysm. The arteries beyond the disk contain venous blood. The left fundus is healthy, but darker than normal, owing to the number and tortuosity of the veins.

May 28. *Nasal examination* by Dr. Roberts discloses a deviation of the septum toward the left, both bony and cartilaginous. Except for pallor of the mucous membrane there is no other abnormality. The pharyngeal mucous membrane is somewhat glazed and slightly congested. The larynx and vocal cords are normal.

Urine. 1020, alkaline, no albumin, no glucose; triple phosphates and amorphous urates.

Blood. Hemoglobin, 80 per cent.; erythrocytes, 3,136,000; leukocytes, 7800; polymorphonuclear cells, 77 per cent.; lymphocytes, 23 per cent.

May 25. *Nurse's Report.* During the attacks the patient becomes weak; objects seem to move around; failure of eyesight for two or three minutes; the face becomes red, and the breathing increases in rapidity for a few seconds. He has had two such attacks within an hour. They usually come on after some unusual occurrence in the ward.

3.30 P.M. Another attack; feels flash of heat over body; head is light; eyes heavy; the radial pulse drops several beats. 4.30 P.M. Slight convulsive spell; twitching of hands—head thrown back—duration one minute.

June 3. Patient is out of bed and about the ward. Complains of weakness. No attack for five days.

June 7. Two attacks yesterday. During attacks pulse feeble and irregular. On auscultation heart sounds are fainter. The respiratory sounds increase in depth, rate, and intensity. Face flushed—twitching of hands. Some attacks are preceded by rolling of the eyes, which is followed by a tremor of the body and hands, the latter quite forcibly at the onset. Attacks sometimes last only from seven to ten seconds.

June 8. Has had a series of attacks. Extremities cold, complains of it; cyanosis; pulse-rate generally about eighteen per minute, increasing at frequent intervals to thirty. After one such acceleration the heart stopped for fifteen seconds. Twitching hands and staring eyes. Patient considered the last a slight attack. Has had frequent attacks during the last twenty-four hours. Vomits a good deal, is very weak.

June 9. Has vomited everything put in his stomach since yesterday. Attacks numerous; asthenia marked. Toward evening he became able to retain peptonized milk, and finally had a restful night without seizures.

June 10. Continued improvement; no more attacks; stomach retentive; appears stronger. At night an attack seemingly like the rest proved fatal. The patient a few minutes before death had been resting quietly.

During his stay in the hospital the patient received in addition to certain drugs administered for their effect upon the gastrointestinal

tract, strychnine, nitroglycerin, and sodium iodide. None of these had any effect upon the cardiac condition. The pulse-rate remained unchanged; the attacks were neither retarded nor abated. It is hardly likely that the iodide would have been beneficial even if the patient had lived longer, for, as the subsequent microscopic examination of His' bundle showed, there was very great destruction of tissue.

The accompanying tracings (Figs. 1, 2, and 3), taken a few days after the patient's admission, show very distinctly that the bradycardia was due to a disturbance of conductivity. The tracing from the jugular vein proves not only a diminution in the function of conductivity as evidenced by the lengthening of the *A–C* interval—the length of time required for the stimulus to pass from the right auricle to the left ventricle, but also the fact that many of the auricular contractions evoked no response whatever on the part of the ventricle. In other words, we have to deal with a condition of complete "heart-block," or what is a better term, auriculoventricular dissociation. It is also to be noted that the frequency of the auricular contractions was markedly increased by the forced inspiration which occurred during the later part of the tracing, whereas the ventricular wave underwent no corresponding change. This is, of course, further evidence of disturbed conductivity. In the cases reported by Stengel, Dock,[33] and Finkelburg,[34] the administration of atropine had no effect whatever upon the rate of the ventricular contractions. This is due to the fact that atropine in man, as in animals, exerts its influence upon the heart through depression of the pneumogastric, which affects the auricles directly, whereas the ventricles, if the contraction stimulus cannot pass through the bundle of His, are uninfluenced by it. In Schmoll's[35] case the administration of atropine reduced the auricular cycle from twelve-tenths to eight and one-half tenths of a second, while the ventricular time underwent no change.

The fact that the ventricles were not affected by vagus influence was shown by the fact that change of posture on the part of the patient—from the recumbent to the sitting, and from the latter to the standing position—had no influence whatever upon the frequency

of the radial pulse. A further study of the tracing shows that the failure of the ventricle to respond to the auricular contraction was not due to any loss of power on the part of the ventricle. The elevations in the systolic phase of the radial tracings are large, powerful, regular in strength, and the blood-pressure is normally

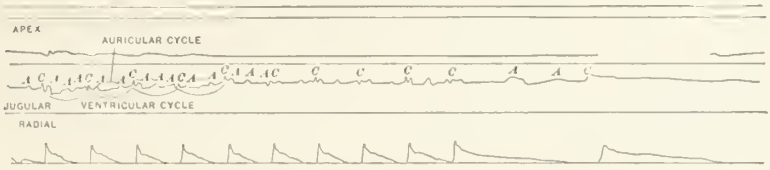


FIG. 1

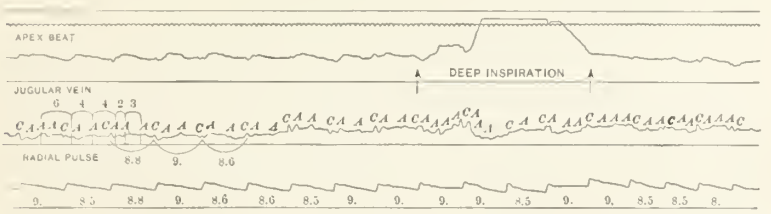


FIG. 2

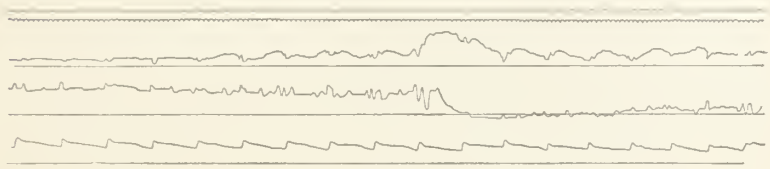


FIG. 3

Cardiosphygmographic tracings. In Fig. 1, during the last two ventricular contractions the speed of the cardiosphygmograph was increased about fourfold. The duration of the auricular cycle varied from four-tenths to twelve-tenths of a second, that of the ventricular cycle from seventeen-tenths to eighteen-tenths of a second. *A*, auricular systole; *C*, ventricular systole. The time marked records one-fifth second.

sustained. This has also been substantiated by the microscopic examination of the ventricular muscle. The sphygmogram also demonstrates the fact that the accessory heart sounds heard over the precordium between the radial pulses must have been auricular in origin, and were not due to abortive ventricular systoles, since

the radial pulse follows regularly each ventricular contraction, as is shown by the apical tracing.

It will be noted that the ventricular cycle required about nine-fifths of a second; the auricular cycle only from three-fifths to six-fifths. The tracing also shows that there is no definite relation between the auricular and the ventricular contractions. If we were simply dealing with a condition of depressed conductivity we should find the *A–C* interval either constant in time or increasing in length. This is not the case; the *A–C* interval at the beginning of the tracing steadily decreases in time until the auricle overtakes the ventricle—indicating complete block. In the latter half of the sphygmogram the deep forced inspiration—between the pointers—produced a marked acceleration of the auricular contractions, while the ventricular rate underwent practically no change.

Additional evidence as to the accuracy of the interpretations of the various phases of the jugular pulse in cases of Adams-Stokes disease has been furnished by a number of observers. Ritchie,[36] Gibson, Finny,[37] Villaret, and Brouardel[38] examined their cases by means of the fluoroscope and were able to demonstrate auriculo-ventricular inco-ordination.

Autopsy. The body is that of a moderately well-nourished adult male; weight, approximately 154 pounds. Rigor mortis is marked; cadaveric lividity slight. Panniculus adiposus is moderate. The muscles are of good volume, bright red in color.

The peritoneum contains a small amount of translucent straw-colored fluid. The abdominal organs are normal in position and relations. The spleen weighs 320 grams, and measures 15 x 10 x 6 cm. The consistency is fairly firm; the cut surface dark red in color, and bulges slightly; the follicles are prominent and well-defined; the trabeculæ are moderately prominent. The *liver* weighs 2050 grams; and measures 28 x 23 cm. The surface is smooth, dark reddish-brown in color with lighter mottlings. It cuts with slightly increased resistance; the cut surface shows normal liver markings. In the posterior portion of the right lobe is a spherical nodule 1 cm. in diameter, dark bluish-gray in color, of a spongy consistency. The *pancreas* presents no pathological features. The

stomach and intestines aside from vascular injection present no unusual features. The *suprarenals* are somewhat smaller than normal; the cortex brownish-yellow. The *left kidney* weighs 190 grams, is firmer than normal, cuts with ordinary resistance, its surface does not bulge, and the capsule strips readily. The cortex and medulla preserve their normal relation in width and are well differentiated. Pyramids are dark reddish-purple and streaked, the cortex considerably lighter, showing normal markings. The *right kidney* weighs 250 grams and presents the same characteristics as the left. The *ureters* show no abnormalities. The *bladder* contains a small amount of turbid, yellowish urine. The walls are of normal thickness; mucous membrane deeply injected. The *left pleural cavity* contains 300 c.c. of translucent straw-colored fluid. At the base are a few firm, fibrous adhesions. The *right pleural cavity* contains 100 c.c. of fluid of the same character as the left. The opposed surfaces of both pleural cavities, not involved in adhesions, are smooth and glistening. The *left lung* weighs 690 grams, and crepitates throughout. On section the lung is light pinkish-gray in color. On pressure a considerable amount of slightly blood-tinged, frothy fluid is exuded. The *right lung* weighs 490 grams and presents the same features as the left. The *pericardium* contains about 20 c.c. of translucent straw-colored fluid. The opposed surfaces are smooth and glistening.

The *heart* weighs 510 grams. Both ventricles and the right auricle contain a small amount of cruor and chicken-fat clot lightly adherent to the wall. The wall is somewhat thinner than normal. The right auriculoventricular orifice admits four fingers with ease. The tricuspid leaflets present no pathological features. A small amount of cruor clot is adherent to the wall of the right ventricle. The right ventricular wall measures 4 mm. in thickness. The papillary muscles are of fair size. The cavity of the left auricle is apparently not enlarged. The wall is of normal thickness. The left auriculoventricular orifice admits two fingers with comparative ease. The mitral leaflets show some fibrous nodular thickening along the line of closure. The leaflets are not distorted. The endocardium and myocardium of the left ventricle present, instead

of their normal appearance, the following characteristics: excepting in the posterior portion, from the insertion of the mitral leaflets to the apex, there is a mass protruding approximately 4 mm. above the surface of the normal endocardium, considerably firmer in consistency than the cardiac muscle. The involvement of the left

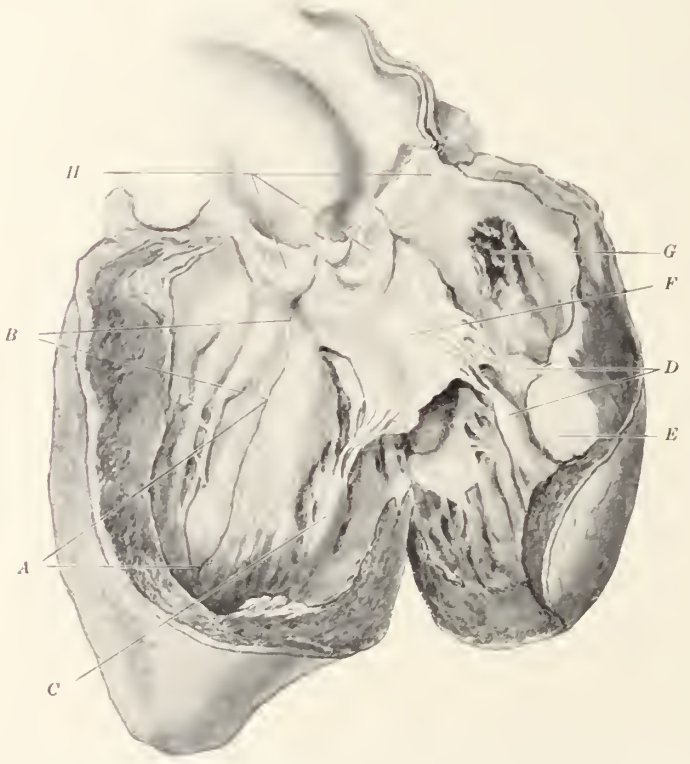


FIG. 4.—The cavity of the left ventricle, showing the gummatous involvement of the wall. *A*, *B*, incision into the gummatous mass, involving the interventricular septum; *C*, *D*, *E*, papillary muscles to which the process has extended; *F*, anterior mitral leaflet; *G*, small clot adherent to the ventricular wall; *H*, aortic leaflets.

ventricle in this mass can be seen in Fig. 4, the area through which the incision (*A*–*B*) runs being the portion of the interventricular septum especially affected, and *C*, *D*, and *E* the papillary muscles through which the process has extended. The endocardium in this region is opaque, grayish-yellow, the surface somewhat nodular.

As the middle portion (*A*, Fig. 4) of the interventricular septum is incised, is seen a firm mass, extending from the endocardium 1.5 cm. toward the right ventricle, and containing a number of homogeneous, yellowish, structureless areas, varying in diameter from 0.5 to 2 cm., and surrounding them areas of a grayish translucent appearance. As the upper portion (*B*, Fig. 4) of the interventricular septum is incised, this mass is seen to involve practically the entire

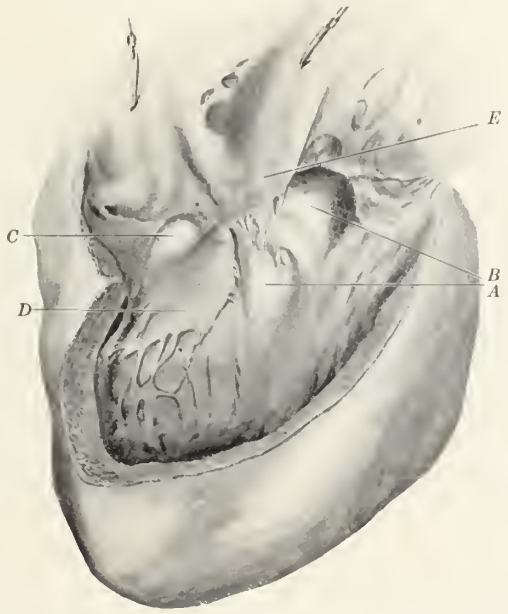


FIG. 5.—The cavity of the right ventricle, showing the extension of the gummatous infiltration from the left ventricle completely through the interventricular septum. *A*, *B*, *C*, gumma presenting on the right ventricular surface of the interventricular septum; *D*, posterior tricuspid leaflet; *E*, middle tricuspid leaflet.

thickness of the septum, presenting on the right ventricular surface of the septum in three nodules, the one (*A*, Fig. 5) measuring 1.5 cm. by 1 cm., at the base of the papillary muscle of the middle tricuspid leaflet; the second (*B*, Fig. 5), somewhat larger, a little above this; and the third (*C*, Fig. 5) at the base of the posterior tricuspid leaflet. All of these nodules consist of a central, firm, homogeneous, yellowish mass, surrounded by dense, grayish, rather translucent tissue.

Nowhere within this mass can any tissue be seen of the macroscopic appearance of normal cardiac muscle. At the borders, the demarcation of this mass from the cardiac muscle is comparatively sharp. Upon the posterior superior portion of the endocardium of the left auricle is a thin grayish-red clot, measuring 2 by 1.5 cm., firmly adherent to the endocardium in its central portion. About the middle of the endocardial surface of the left ventricular portion of the interventricular septum is a similar area measuring 0.3 by 0.6

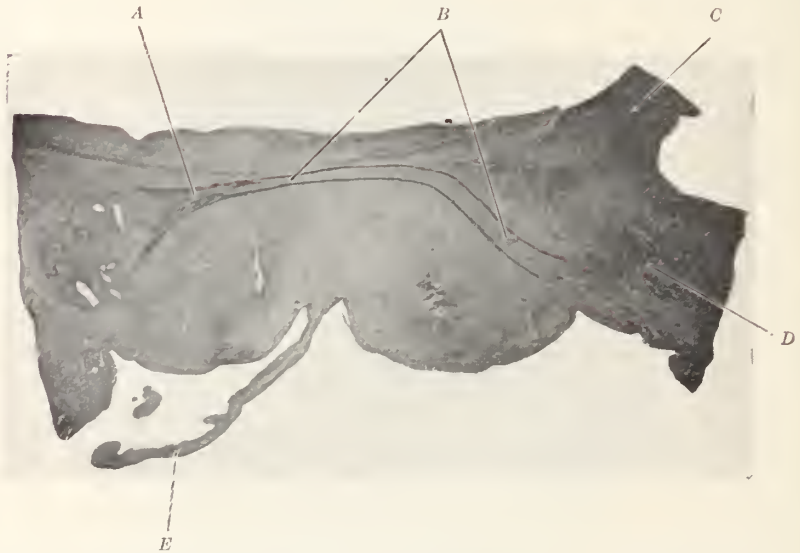


FIG. 6.—Photograph (slightly enlarged) of Section No. 1, with a tracing, showing the course of the bundle of His, from the interauricular septum to its bifurcation. *A*, the bifurcation of the bundle of His; *B*, the course of the bundle; *C*, base of the anterior mitral leaflet; *D*, the interauricular septum; *E*, middle tricuspid leaflet.

cm. The endocardium under these clots is rough and granular. The left ventricular wall, free from involvement in the mass above described, is 1.2 cm. in thickness. The portions involved in this mass vary from 1.4 cm. to 1.8 cm. in thickness. There are no signs of sclerosis in either coronary arteries or any of their branches as far as they can be followed. Slightly above the aortic leaflets are a few small yellowish areas, pin-head in size. There is no sclerosis and no plaque formation.

The only features of interest in the histological examination of the tissues, excepting those of the heart, are a moderate degree of chronic passive congestion of the spleen, liver, kidneys, pancreas, intestines, stomach, and lung; slight œdema of the lungs; and moderate atrophy of the cortical tissues of the adrenals.

Histological examination of the heart (not including the auriculoventricular bundle of His): The cardiac muscle not involved in the growth above described shows only a moderate amount of fragmentation with slightly decreased prominence of the transverse striations. The portions particularly involved in the pathological process present somewhat varying pictures. In those areas where the process is most advanced there is found centrally a necrotic, homogeneous mass, staining moderately well with eosin, and containing, especially toward the periphery, some nuclear dust. Nowhere within this area is any cell structure preserved. Surrounding this necrotic area is a zone composed primarily of lymphocytes with some polymorphonuclear leukocytes and plasma cells, and a considerable number of young bloodvessels with walls composed of a single layer of endothelium. Toward the periphery numbers of small spindle-shaped cells appear and some larger epithelioid cells, while lymphocytes and plasma cells are still present in small numbers. Young bloodvessels become much more numerous. In a number of areas outside of this zone can be seen one composed of fibrous connective tissue, some of which have undergone hyaline degeneration. In none of these areas are giant cells to be seen. The cardiac muscle immediately surrounding these areas is, in most cases, extensively disintegrated, and here and there can be seen a few fibers apparently undergoing hyaline degeneration. The areas in which the process has not proceeded to the stage above described present two pictures. In some of them there is merely a dense infiltration of lymphocytes and polymorphonuclear leukocytes with total disappearance of the normal muscular tissue; in others the normal tissue is moderately well-preserved, but thoroughly infiltrated with lymphocytes, young connective-tissue elements, and newly formed capillaries. The endocardium of the portions of the heart involved in this process is greatly thickened, both the endo-

thelium and the subendothelial layer participating in the thickness, which is due to a proliferation of endothelial and connective-tissue

FIG. 7.—Photomicrograph of the bifurcation of the bundle of His *A*, undivided portion; *B*, the branch to the right ventricle; *C*, the branch to the left ventricle.

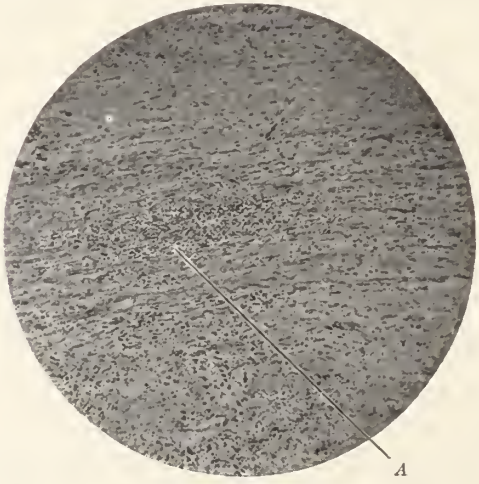


FIG. 8.—Photomicrograph, showing an area of round cell infiltration in the bundle of His.

elements without the signs of an acute inflammatory process. The pericardium presents no pathological features. A few of the smaller bloodvessels show slight endothelial proliferation. Aside from this, their study reveals no abnormalities.

Diagnosis. Gumma of the heart; acute vegetative endocarditis; chronic passive congestion of the spleen, liver, kidney, intestines, stomach, and lungs; œdema of the lungs; angioma of the liver; bilateral pleural transudate.

Histological Examination of the Auriculoventricular Bundle of His. For histological examination of the auriculoventricular bundle of His, a section of the heart corresponding to the following boundaries was excised: Considering the heart to be placed vertically, with the ventricular septum anteroposteriorly, the anterior boundary corresponded to the middle of the right aortic leaflet; the upper boundary, to a line drawn parallel with the free margin of the aortic leaflets 8 mm. below the uppermost portion of their attachment; the lower boundary, to a line drawn parallel to the upper boundary 1.4 cm. below the lowest point of insertion of the posterior aortic leaflet; the posterior boundary, to the posterior margin of the interauricular septum. The anterior leaflet of the mitral valve and a portion of the median tricuspid leaflet were then cut away from this block. Serial sections in a plane at right angles to the long axis of the heart were cut from this block, commencing at its inferior surface. The sections were 10 microns in thickness. Each sixth section was stained with hematoxylin-eosin; each seventh section with hematoxylin-van Gieson. Subsequently the intervening sections of the first one hundred and fifty were also stained with hematoxylin-eosin.

As the histological findings involving the bundle of His are limited to a series of thirty-nine consecutive sections, we will confine our attention to them. Numbering the uppermost one of these, that is, the one nearest the auricles, 1, the numbers will increase as we approach the apex of the heart. Though in some of the sections above No. 1, portions of the bundle are visible, it is here that it becomes evident throughout its course from the auricular septum to its bifurcation into a right and a left branch. The macroscopic

appearance of this section is shown in Fig. 6, in which the course of the bundle, just visible macroscopically in the section, is shown running in a curved direction from slightly above the auriculoventricular septum toward the left ventricular surface of the interventricular septum, then just beneath the endocardium to the point of bifurcation *A*. Fig. 7 shows the bifurcation into the branch for

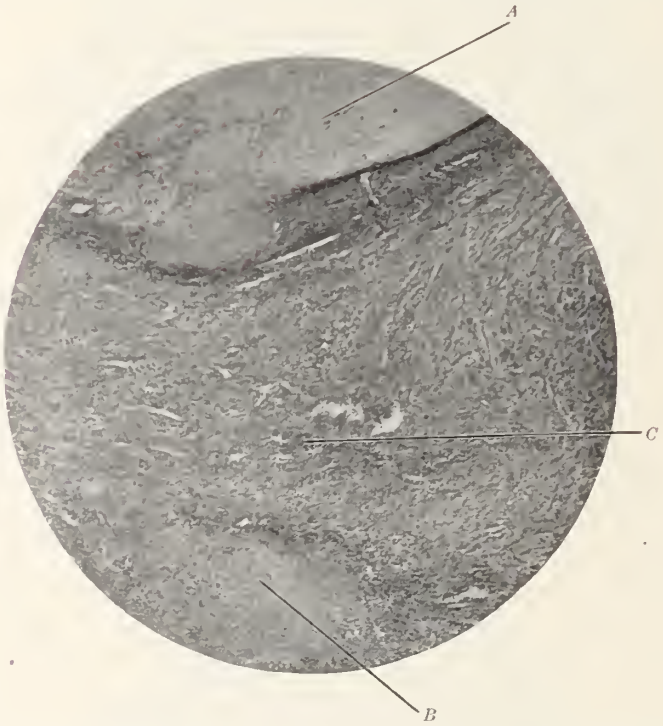


FIG. 9.—Photomicrograph showing an area of round-cell and spindle-cell infiltration in the bundle of His, just as it emerges from the interauricular septum. *A*, auriculoventricular septum; *B*, base of middle tricuspid leaflet; *C*, round-cell and spindle-cell infiltration in bundle of His.

the right ventricle and the branch for the left ventricle. Though the course of the bundle throughout the first seventeen sections is easily traceable, it is microscopically by no means intact. Especially throughout the undivided portion there is an extensive round-cell and young connective-tissue infiltration. Some of these areas are shown in Figs. 8 and 9. As Section 18 is reached, a much more

extensive involvement of the bundle is observed, resulting in a complete solution of its continuity. Here the gumma shown at *G* in Fig. 10, which is a reproduction of Section 18, has extended sufficiently to involve the bundle at the point *H*, Fig. 10, resulting in a complete disappearance of the muscle fibers and their substitution by the infiltrating tissue of the gumma. This interruption in the continuity of the auriculoventricular bundle is shown in Fig. 11. Photomicrographs of the terminations of the two fragments are shown in Figs. 12 and 13. Throughout the remaining sections in

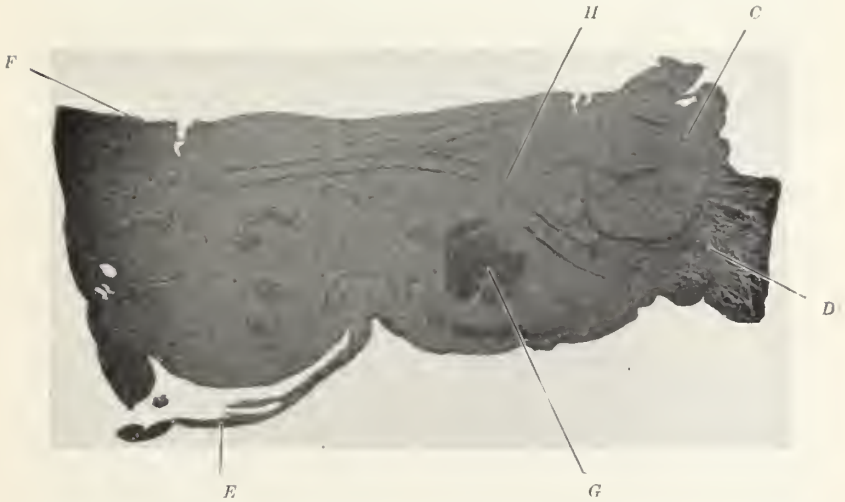


FIG. 10.—Photograph (slightly enlarged) of Section No. 18, with a tracing, showing the location of the interruption in the bundle of His; *H*, location of the interruption in the bundle of His; *G*, the necrotic centre of the gumma destroying the bundle at the point *H*, *C*, *D*, *E*, and *F*, as in Fig. 3.

which the bundle is visible this interruption persists. Finally, arriving at a level below that of the undivided portion of the bundle, only the right and left branches can be seen, the left lying just beneath and parallel to the endocardium of the left ventricle, the right showing as a small bundle cut in cross-section lying nearer and nearer to the right ventricular surface of the septum, as we descend toward the apex of the heart.

Though numerous theories have been proposed for the cause of heart-block in the human being, almost all have been without patho-

logical basis. From the recent work in the physiology and anatomy of the heart, we now have every reason to believe that a definite anatomical lesion involving the bundle of His is responsible for this condition in man. On account of the absence of examinations for lesions in the bundle of His in the early pathological reports of cases of Adams-Stokes disease, their consideration in the light of our present knowledge can be practically ignored. The findings looked upon as causal in these cases were probably purely coincidental.

A number of cases have been recently reported with more or less definite pathological lesions involving the auriculoventricular bundle. Stengel has reported a typical case in which there were macroscopically fibrous and calcareous processes at the base of the anterior mitral leaflet involving the area traversed by the bundle of His. Schmoll's[39] case showed scar formation in and around the bundle of His leading to atrophy of the muscular elements of the bundle and separation of its fibers from the ventricular muscle. Handford[40] reports a case in which the autopsy revealed gummas, involving the auriculoventricular septum. He does not report the histological examination of the bundle of His itself. The case of Jellick, Cooper, and Ophüls[41] showed anemic necrosis of the muscular septum in the region of the bundle of His consequent upon recent thrombosis of its nutrient arteries. The autopsy of Grünbaum's[42] case disclosed a gumma of the interventricular septum. Keith and Miller[43] report a case which was apparently one of Adams-Stokes disease in which there was found cicatrization of a gummatous mass involving all of the upper portion of the bundle of His and in addition gumma of the coronary sinus, obliteration of the superior vena cava, and partial occlusion of the coronary arteries. Sendler[44] saw a case in which a cartilaginous tumor of the interventricular septum was found. The reports of most of these cases have not included the histological examination essential to the determination of the lesion in so delicate a structure as the bundle of His.

The association of syphilis and Adams-Stokes disease appears to have been a peculiarly frequent one. Aside from the cases of Handford, Keith and Miller, and Grünbaum, quoted above, Jacquet,

Osler, and Erlanger report cases in which there was clinical evidence in support of the view that syphilis was responsible for the condition Erlanger and Jacquet mention this frequency of association, but the latter apparently assumes some obscure relationship between the

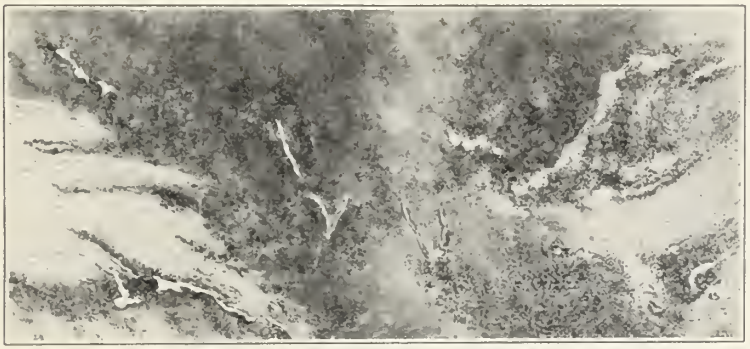
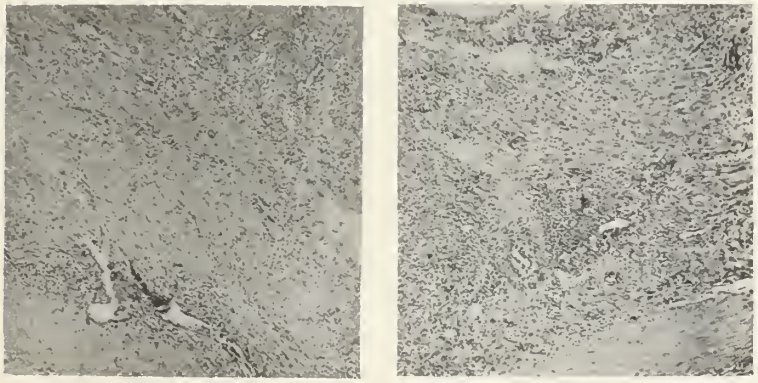


FIG. 11.—The interruption in the continuity of the bundle of His. The two fragments of the bundle are seen entering at the right and left sides of the illustration. Between their two terminations is the infiltrating tissue of the gumma shown at *G*, in Fig. 4. Photomicrographs of the terminations of the two fragments are shown in Figs. 12 and 13.



FIGS. 12 and 13.—Photomicrographs of the terminations of the two fragments of the bundle of His, as shown in Fig. 11.

two rather than the actual gummatous involvement of the bundle, as occurred in our case and apparently also in some of the earlier cases reported.

As in all other pathological conditions, the prognosis in Adams-Stokes disease depends upon its cause. First of all, we must clearly bear in mind that all cases of marked bradycardia are not necessarily instances of Adams-Stokes disease. Bradycardia may result from a great number of causes. Thus, it may occur physiologically from hunger, fatigue, pregnancy, and from individual or family idiosyncrasy. Clinically it is met with during the convalescence from infectious diseases, such as pneumonia, typhoid fever, influenza, diphtheria, erysipelas, etc. Riegel has noted the symptom in many cases of gastrointestinal disturbance, gastric ulcer, chronic gastritis, carcinoma, and jaundice. A slow pulse may also be encountered in diseases of the respiratory tract, notably emphysema, and in disease of the heart or bloodvessels—coronary sclerosis, myocarditis, atheroma of the aorta, and embolism of the coronary artery. It occurs also in renal disease—uremia, hematuria. Occasionally it has been noted in diabetes, chlorosis, or other forms of anemia. Bradycardia also occurs in diseases of the nervous system—epilepsy, apoplexy, meningitis, tumors of the brain, diseases of the medulla and cervical spinal cord, mania, paresis, and melancholia. It has been reported in diseases of the genital system and of the skin. Finally comes the important toxic group—tobacco, coffee, alcohol, lead poisoning, digitalis, etc.[45 48]

So much for bradycardia simplex. In order to make a diagnosis of Adams-Stokes disease we must have not only the slow pulse, but also the increased pulsation of the veins, and the nervous symptoms. It seems quite reasonable to suppose from what we now know of the pathology of the bundle of His that minor grades of auriculoventricular dissociation may exist for years without giving rise to marked symptoms. In other words, the degenerative changes in the bundle are so slight in extent, and so slow in progression, that the patient dies from some other cause before the typical symptoms of Adams-Stokes disease develop. Doubtless the combined studies of the arterial and venous pulses which are now being made by different observers with the Jacquet cardiosphygmograph, the Mackenzie polygraph, or other instruments, will in the near future throw much light on this and many other hitherto obscure cardiovascular diseases.

Since it has already been shown that several cases of Adams-Stokes disease have been due to gummas involving the bundle of His, heroic doses of the iodides, if resorted to at a sufficiently early stage, may bring about a cure. This has apparently been accomplished in one case reported by Jacquet and Erlanger. In cases in which the lesions are sclerotic or necrotic in character no expectation of recovery can be entertained and they offer practically no hope of other than a fatal issue.

From the accumulated evidence of those cases of Adams-Stokes disease in which satisfactory tracings have been made it seems that the cases were due to heart-block. Now the question arises, May heart-block exist without producing the symptoms of Adams-Stokes disease? Belski and Mackenzie have reported cases of auriculoventricular dissociation without the symptoms of Adams-Stokes disease other than bradycardia. It follows, therefore, that there must be another factor concerned in the production of the symptom-complex. In all probability the ventricular asystole, which is the cause of the syncopal attacks, is brought about by the sudden occurrence of complete heart-block, for as Erlanger has shown, when the bundle of His is suddenly compressed, ventricular activity is in abeyance for a considerable time, that is, for the time required by this structure to inaugurate its own rhythm. This explanation, of course, is applicable only to cases of partial heart-block. Cases such as ours, in which the block is complete, cannot be accounted for in this way. Schmoll has suggested that in the latter event a condition of ventricular depression of conductivity exists, analogous to that which is present in the bundle of His, while the stimulus production goes on normally. If such a state of affairs existed we should expect to find a definite relationship between the rate of the ventricular contractions before and after the block took place. This has actually been noted in a few cases. Thus in His' case the pulse-rate fell from 36 to 18, and later returned to 36. Once more it fell to 12, and subsequently rose to 24, indicating that the original rhythm was undisturbed, but that it required more than the normal number of stimuli to provoke a response. Similar observations have been made by Erlanger, Cornil, and Schmoll, and are, of course, the exact reverse of those noted by Hoffman[47] in cases of paroxysmal tachycardia.

In conclusion, we desire to express our indebtedness to Mr. E. B. Krumbhaar, a student in the University of Pennsylvania, for assistance in the histological examination of the heart.

BIBLIOGRAPHY

1. Dublin Hosp. Reports, 1827, vol. iv, 396.
2. Dublin Quart. Jour. Med. Sci., 1846, ii, 73.
3. Traité du Maladie du Cœur.
4. The Nervous Affections of the Heart, 1904, p. 65.
5. Deut. Arch. f. klin. Med., lxxii, No. 2.
6. Jour. Physiol., 1883, iv, 43.
7. Rev. de Méd., 1885, v, p. 161.
8. Compt. rend. du Soc. Biol., Paris, 1893, p. 170.
9. St. Petersburg med. Woch., 1897, p. 301.
10. Jour. Exper. Med., November 25, 1905; Ibid., January 25, 1906, p. 8; Bull. Johns Hopkins Hosp., June, 1905.
11. Amer. Jour. Med. Sci., 1905, cxxx, 1083.
12. Erlanger, Jour. Amer. Med. Assoc., 1906, June 2, 1895.
13. Arbeit. a. d. Klin. zu Leipzig, 1893, p. 23; Zentrbl. f. Phys., 1895, ix, 469; Deut. Arch. f. klin. Med., 1899, lxiv, 316.
14. Jour. of Physiol., vol. xiv.
15. Arch. f. Anat., 1904, p. 1.
16. Arch. f. Physiol., 1904, suppl. 1.
17. Arch. internat. d. Physiol., 1904, i, p. 278.
18. Pflüger's Archiv., cviii, p. 267.
19. Lancet, 1906, i, 623.
20. Vide Aschoff, Münch. med. Woch., September 26, 1905; Centrbl. f. Physiology, 1905. xix, 70, 298.
21. Ewart, Progressive Medicine, September, 1906.
22. Brit. Med. Jour., 1906, ii, 22.
23. Arch. neerl. d. sc. exactes, Harlem, 1906, ser. 2, tome xi.
24. Lancet, February 13, 1904.
25. Lancet, June 4, 1904.
26. Jour. Anat. and Physiol., 1879, xiv, 4.
27. Brit. Med. Jour., 1905, ii, 847.
28. Medical Record, November 21, 1903.
29. Lancet, 1903, ii, 516.
30. Rev. d. Med., 1883, p. 1001.
31. Glasgow Hosp. Reps., 1901, p. 413.
32. Deut. Arch. f. klin. Med., lxiv, p. 316.
33. Med. News, Aug. 19, 1905.
34. Deut. Arch. f. klin. Med., April 6, 1905.
35. Jour. Amer. Med. Assoc., 1906, xlvi, 361.
36. Proc. Royal Soc. Edin., 1905, xxv, 1085.
37. Brit. Med. Jour., 1906, ii, 967.
38. Arch. d. Méd. Exper., 1906, xviii, 230.
39. Deut. Arch. f. klin. Med., 1906, lxxxvii, p. 554.
40. Brit. Med. Jour., December 31, 1904.
41. Jour. Amer. Med. Assoc., 1906, xlvi, v. 361.
42. Quoted by Ewart, Progressive Medicine, September, 1906, p. 74.
43. Lancet, November 24, 1906.
44. Centrbl. f. klin. Med., 1892, p. 642.
45. Grob. Deut. Arch. f. klin. Med., xlii.
46. Babcock. The Heart and the Arterial System, 1903, p. 624.
47. Ztsch. f. klin. Med., vol. xliii, p. 206

DISCUSSION.

Dr. James M. Anders: I would like to call attention to a case seen with Dr. Neff a few days ago, in the southern part of the city, which case I believed to be one of Adams-Stokes disease. It followed the menopause, and I recall another instance in which the Adams-Stokes syndrome developed soon after the change of life. We may look upon such cases as being functional in character. Physical examination in the case seen with Dr. Neff revealed nothing but slight hypertrophy of both ventricles and beginning arteriosclerosis. The pulse was exactly 28 per minute and upon auscultation we could hear two feeble sounds apparently due to a feeble ventricular contraction, but in reality to auricular contraction. One fact not brought out in the excellent paper of Drs. Ashton, Norris, and Lavenson, and one which I observed in a previous case, is that when apparent recovery occurs in these cases the symptoms tend to recur from time to time. I think the fact that recurrence takes place when there is an incomplete block and in the functional variety should be borne in mind.

Dr. Norris: The point that I tried to bring out was the fact of the sound heard over the heart between the ventricular sounds was due to auricular contraction and not due to abortive systole. Even if the ventricular contraction had been so feeble that the impulse had not reached the radial artery, it would have been evident at the apex beat, but such was not the case. We did hear the auricles contract.

As to treatment, in our own case the iodides could hardly have been of benefit, because the infiltration of the bundle of His was so extensive. In cases referred to by Dr. Osler and others the symptoms disappeared under the administration of iodides. The question arises, Were these syphilitic cases in which there had been incipient gummatous infiltration of the auriculoventricular septum?

SYMPTOMS AND SIGNS IN URINARY LITHIASIS.[1]

By CHARLES LESTER LEONARD, A.M., M.D.

As the result of the greater diagnostic accuracy obtainable by the Röngten method in calculus nephritis and ureteritis, a more exact differentiation is possible between the symptoms and signs of these conditions. It is, however, impossible to differentiate them with precision from intra- and extra-ureteral and renal conditions without the aid of the Röntgen diagnosis. It is not the purpose of this paper to discuss the symptomatology of these other conditions, but to point out the differences in symptoms and signs between renal and ureteral lithiasis that have a bearing upon the indications for treatment, after the size and position of the calculus has been determined by the Röntgen method. In addition, brief mention will be made of other renal conditions in which aid in diagnosis can be expected from this method in favorable cases.

This study is particularly valuable since additional knowledge has formed the basis for new indications for treatment, which are in a great part based upon the symptom-complex presented. These symptoms and signs are best studied by discussing the atypical symptomatology, and attention can be confined chiefly to those particularly indicative symptoms that materially assist in differentiating between ureteral and renal colic, and characterize the different stages in the progress of a calculus from the renal pelvis to the bladder.

This study has for its basis my series of 352 cases examined by the Röntgen rays for suspected calculus and particularly the seventy-one cases in which a calculus has been diagnosed and the

[1] Read December 5, 1906.

diagnosis confirmed by the recovery of the calculus either at operation or when it was subsequently passed.

The differentiation between ureteral and renal colic cannot be approximated in possibly more than half the cases by the study of the symptoms and signs alone. There are, however, certain symptoms and groups of symptoms, which, if only in a measure definite, suffice to form accurate indications for treatment, when taken in conjunction with the findings of the Röntgen diagnosis. That they are sufficient and of value as determining factors is evidenced by the passage of calculi in twenty-eight cases where the expectant treatment had been based upon these indications.

The symptoms and signs alone cannot form the basis for rational treatment, as they do not comprise all the accurate knowledge that can be obtained of these conditions. On the other hand, the Röntgen diagnosis, though accurate and explicit as to the size, number, and location of the calculi, does not form of itself a sufficient indication for operative removal of the stone. The symptoms and signs must, in addition to and in conjunction with the Röntgen diagnosis, show that the calculus endangers the functional efficiency of the kidney or ureter, and that it is improbable that it will pass by the natural channels.

In the early days of Röntgen diagnosis, much meddlesome and unwarranted surgery was done in removing sterile and harmless foreign bodies from the tissues. In a like manner, the surgical removal of some calculi would be meddlesome surgery. The Röntgen diagnosis is accurate, but should not of itself form an indication for operative removal of a calculus. The effect of the calculus upon the kidney and ureter should first be considered, and this effect, as expressed in symptoms and signs, is therefore of value in determining the indications for treatment.

In addition to the value in determining the indications for treatment, the study of the symptoms and signs is valuable in suggesting the possible presence of stone in obscure cases, and that a calculus should be detected or excluded. There are many cases in which the symptom-complex points to the presence and progress of a

calculus down the ureter, but where the symptoms have suddenly ceased and even the urine may have become absolutely normal.

It is essential to the integrity of the kidney to determine whether a calculus is present and has become quiescent or occlusive, or has passed into or out of the bladder, without being detected. The symptoms subside in either case and yet, if the calculus remains quiescent it may form the locus about which irritation and infection take place; if it is occlusive, a hydronephrosis results and the functional life of the kidney is threatened as the cessation of activity means final atrophy and degeneration. If, on the other hand, it is detected in the ureter, the indications for treatment will depend upon its size and the progress of the symptoms and signs, while, if it is shown to have passed or to be absent from the urinary tract, no treatment is required.

There is little actually known regarding the causation or method of formation of stone, and yet many factors must be properly adjusted to each other, or the normal individual would be more liable to stone formation. Mr. Reginald Harrison has pointed out that if a normal man were to void only half of the 10 grains of uric acid usually excreted in a day by the concretion of the remainder, he could, in forty-eight days, form a stone weighing not less than half an ounce. He says: "If the production of stone were dependent upon a single link, rather than upon a chain of them, it is probable that these disorders would be far more common and general than they actually are."

It may be said in addition that stones are probably much more frequently formed than one might be led to suppose by the number of cases presenting themselves for examination. This has been illustrated in a manner by the greater frequency of ureteral as compared with renal stone, since a more accurate means has been determined for finding them and a more definite knowledge of their symptoms has led to a suspicion of their presence.

All ureteral calculi probably form in the pelvis of the kidney and many undoubtedly pass without giving rise to suspicious or severe symptoms.

The symptoms and signs of calculous conditions in the kidney

and ureter are due to irritation produced by their presence, to injury which they inflict in their passage or movements, or to obstruction of function. The severity of the symptoms is often in inverse ratio to their size, but proportionate to the extent to which they interfere with the function of the kidney.

In nephrolithiasis, the symptoms and signs, when due to the irritation produced by the calculus acting as a sterile foreign body, are very slight, unless partial or temporary occlusion is produced. A lumbar ache, increased by exertion, with a constant but small amount of albumin, has been observed in these cases. Sometimes the calculus has been very large and the albumen has persisted for eight or ten years or longer, or it may be entirely imbedded in the tissues, or enclosed in a cyst or occluded calyx. Where the calculus is rough and adhesions are present, sharp pain may have been experienced and blood is often found in the urine. The movable renal calculus of medium size produces the most characteristic and intense symptoms with blood if it is rough, or accompanied by pus if infection is added. The intense agony and pain of renal colic with its quick onset without prodromes, and its almost as sudden relief are characteristic of obstruction of the hilum. It is the classical stone in the kidney, with pain radiating often in all directions from the kidney, down the ureter to the groin, the testicle and the thigh. Temporary obstruction and mild attacks of colic have been produced by the passage of blood clots and mucopurulent plugs. When infection has been present for some time there is an absence of all acute symptoms, a dull ache in the lumbar region and pus and earthy phosphates in the urine persisting.

The most constant signs in the obscure cases are a small, constant amount of albumin or traces of blood, accompanied by a dull ache or sense of discomfort in the renal region. Palpation is of little diagnostic value unless a large sterile stone is present without obstruction, when tenderness may be elicited if the pelvis of the kidney can be reached. Hydro- and pyro-nephrotic kidneys can be palpated, but the information gained is only confirmatory of more obvious symptoms except where complete obstruction is

present. The presence of a constant lumbar ache, with persistent albuminuria of mild degree with an absence of any history of acute attacks of colic should always suggest the possible presence of a quiescent sterile renal calculus. This suspicion would be increased if there was a trace of blood found from time to time in the urine. There have been three cases of this character among those studied. In them fixed or encysted calculi of large size have been found, one calculus measuring over two and one-half inches.

It is particularly difficult during the first attack of colic to differentiate a calculus that enters the hilum of the kidney and blocks it, but does not enter the ureter, from the small calculus that has entered the ureter and can safely be allowed to pass into the bladder. The differentiation between renal and ureteral colic and the indications for treatment will be discussed after the review of the symptoms of ureteral lithiasis. As has been said, the irritation and obstruction produced by the calculus during its passage through the ureter are responsible for the symptomatology.

There is a wide range in the severity of these symptoms depending upon the degree of irritation and the completeness and point at which the obstruction takes place, the size and character of the calculus bearing an evident relation. The symptoms are so clearly subdivided by the point at which the obstruction takes place that they will be studied according to this subdivision. The most common seat of impaction has been the uretero-iliac junction and the second that point in the juxta-vesical portion of the ureter where it enters the wall of the bladder. The portion above and the portion below the uretero-iliac junction exhibit symptoms that are distinct and characteristic of their involvement, though, in some cases, there has been a merging of the one into the other. In general, it may be said that the symptoms of calculus approximate those of renal lithiasis when the upper portion of the ureter is involved, while vesical calculus is so closely similated by calculous involvement of the lower portion that, in more than one of these cases, the bladder had been opened and explored for stone.

In the upper portion of the ureter the seats of impaction of calculi are at the uretero-iliac junction, where the ureter bends and

is flattened in crossing the artery, and at a point of narrowing about an inch below the lower pole of the kidney. This latter point is where the larger calculi that pass from the kidney may become lodged and are then liable to give rise to acute symptoms of obstruction. These are the calculi that more frequently demand operative removal. The smaller calculi, since they produce less marked symptoms, are more difficult to detect and are often more dangerous on this account. They may cause complete obstruction with very few or no marked symptoms, or may even, when no larger than a grape seed, cause intense and acute paroxysms of pain with hemorrhage out of all proportion to their size. It is in the insidious attacks with few or masked symptoms that an exact knowledge of the position, size and location of the calculus is most essential to the safety of the patient. These cases have little danger when the exact size and location of the calculus have been determined, and the presence of a bilateral urinary flow, with a normal excretion of urea, established. The frank, open cases with severe attacks of pain lose their grave aspect when it is known that the calculus is small enough to pass and what its exact position is in the ureter. A previous history of a series of attacks increasing in frequency, after the exact diagnosis has been established, means, in such cases, that natural forces are working and are competent to finally expel the calculus. Each attack can then be welcomed as an evidence of continued activity and each as a step nearer permanent relief.

Occlusion generally precedes the onward movement of a calculus in the ureter. By obstructing the urinary flow it produces distention of the ureter and pelvis of the kidney. These, in contracting, produce the force which dilates the ureter at the seat of the calculus impaction, and pushes it onward. This process is slow and gradual and gives rise to symptoms that extend over long periods. There may be a constant lumbar ache that persists between attacks, with an increasing ache and discomfort prodromal in character during the distention of the ureter, the acute attack of ureteral colic following it, and subsiding after the calculus has been pushed along or the urine has escaped around it. This flush-tank variety of hydronephrosis is characteristic of these

attacks, but may also be caused by any interference with the urinary flow, as by twists or valves in the ureter.

The history of a calculus passing down the ureter is characteristic. Attacks increasing in frequency and generally in severity, should lead to the suspicion of a quiescent calculus that occasionally produces obstruction and may or may not be passed, depending on its size and its location in successive attacks. The attacks may not be identical in symptomatology, but a sufficient number of the symptoms are repeated to establish their identity while the lumbar ache and discomfort precede and follow each attack, becoming continuous as they come closer together.

Besides this prodromal lumbar ache that persists and subsides gradually after the sharp colic attack, ureteral lithiasis is characterized by the radiation of the pain. In the crisis of the acute colic there is generally a point in the line of the ureter from which the pain seems to shoot upward into the kidney and downward along the distribution of the genito-crural nerve. The point of greatest intensity is frequently over the seat of obstruction and when the upper portion of the ureter near the kidney is involved the pain is accompanied by nausea and vomiting. This is more liable to occur when there is complete occlusion. The distribution of the pain differs from that of renal calculus in that it does not radiate around the body, and from that of calculus in the juxtavesical portion of the ureter, in that it does not approximate that of vesical stone. That is to say, the pain is felt in the scrotum-testicle or labium major and down the thigh and in the groin. It does not involve the glans penis, the urethra or the ureatus urinaris. In addition to the pain, stone in the upper ureter often produces a reflex contraction of the psoas muscle, due apparently to irritation. There is found to be a characteristic tendency to flex the thigh upon the body in these cases and an unwillingness to extend it, even after the acute attack of pain has subsided.

Palpation, in these cases, often yields valuable results. While the ureter can be palpated and its thickened and tender condition noted, in other forms of chronic ureteritis, in calculus ureteritis it is often possible, not only to detect and palpate the distended ureter,

but also to locate an exquisitely tender point, and even to feel the calculus. To palpate a calculus impacted at the uretero-iliac junction, the patient should lie with limbs extended. The bifurcation of the aorta into the common iliacs should then be found and the finger carried along the common iliac artery one and a half to two inches. The pulsation of the iliac can often be felt, and if a calculus is present, an intensely tender spot sharply localized will be encountered. This tenderness has been confused with that of an inflamed appendix, or a displaced and inflamed ovary, and these organs have been removed, in some of which cases calculi were subsequently found and removed from the ureter. The ureter may or may not be found distended above the calculus as a hydro-ureter, and when distended as the result of occlusion the similarity to an inflamed appendix is more marked. Palpation is also of value when calculi lie low down in the juxtavesical portion of the ureter, where they can be felt through the rectum or vagina.

The most characteristic sign of ureteral stone, especially the freely movable or small, rough calculi, is repeated traces of fresh blood in the urine. This sign may, however, be entirely wanting if the calculus has been quiescent. Where obstruction has been present, sufficient to produce backward pressure upon the kidney, albumin may be found. When complete occlusion has taken place, the urine may be perfectly normal, since it may come from but one kidney, but the daily amount of urea excreted may be too low. Infection and pus in ureteral lithiasis have accompanied calculi lodged just below the kidney or just outside the bladder, and have been sufficiently intense, with such grave acute symptoms, as to demand immediate operation. In these instances the accurate localization facilitated, and was confirmed by, the operation.

The symptoms of calculus in the juxta-vesical portion of the ureter differ distinctly from those of calculus at or above the uretero-iliac junction. The signs are nearly identical, though there is less liability to blood in the urine, and more chance of infection. There is often a history of previous attacks one, two, three, or more

years, or as many months, apart, with an increasing frequency during the last year or six months. The point of acute pain will be found in a calculus that is passing down the ureter to be gradually lower, and will usually mark the points where impaction is most frequent. There is often a sense of fulness in the renal region, the result of an hydronephrosis of either passive or flush-tank variety. This is more common with calculus impacted at the uretero-iliac junction, while infection is more liable to occur when the impaction is near the bladder and the occlusion is incomplete.

The most noteworthy characteristic of the pain symptomatic of calculus in the juxta-vesical portion of the ureter is the closeness with which it resembles vesical or prostatic calculus. The presence of some of the symptoms of ureteral lithiasis and pain ascending to the kidney or down to the thigh should lead to a suspicion of the true cause. The symptoms simulating vesical stone are apparently due to the involvement of the same nerve supply and interference with the vesical trigone. The pain is referred to the glans penis, or the meatus in the female, and along the line of the urethra. It may be very intense and is often felt while the bladder is contracting as well as at the end of micturition. Pain in the scrotum and testicle or the labium major, in the groin and the inner side of the thigh are also often present with pain ascending to the kidney and less frequently a dull lumbar ache.

Acute attacks of colic are more rare, especially if the calculus has been quiescent. Partial occlusion may result in hydro-ureter and hydronephrosis, or these may be combined with infection. Infection may produce very severe symptoms resulting in complete occlusion, and often demands immediate operation. In one patient three calculi smaller than grape seeds, together with infection, produced occlusion which was relieved and the calculi removed by operation at the seat of impaction. In other cases the bladder has been opened and explored for encysted calculi or has been treated for cystitis when the ureter was the seat of disease. As in calculus situated above the iliac artery there is great difficulty in differentiating calculus conditions of this portion of the ureter from

extra-ureteral or intra-ureteral conditions. In fact, it is because the similarity in symptomatology is so close and an exact method of diagnosis did not exist, that the Röntgen method is so valuable and has made possible a closer differentiation in the symptomatology.

An exact diagnosis cannot be made without the assistance of the Röntgen method, even with the more definite understanding of the symptoms. Their study is most valuable as confirmatory evidence and in securing data upon which the treatment can be based.

The differences in the symptoms of renal and ureteral colic are that the onset and end of the attack are more sudden. Ureteral colic is preceded by a prodromal lumbar ache that becomes more intense until the crisis or acute attack of pain. This lumbar ache subsides by lysis and may not entirely disappear between the colic attacks. The pain is localized at the seat of obstruction in the ureter and radiates upward as well as downward. In the kidney, the pain is most acute in the region of that organ and radiates downward or around the body, while, if there has been an ache from a quiescent renal calculus, it has not gradually increased in volume, and is generally absent after the attack. In colic due to calculus in the upper ureter there is generally reflex irritation of psoas muscle and contracture, while palpation will detect a distended and tender ureter, with an acute point of tenderness at the seat of impaction. The hydronephrotic kidney can be felt sometimes in both conditions, but is fluctuating and of the flush-tank variety in ureteral stone.

In calculus impacted in the juxta-vesical portion of the ureter the symptoms of ureteral calculus are combined with those of vesical stone, with the absence of the psoas reflex and the point of tenderness at the uretero-iliac junction. There is less liability to lumbar-ache and fewer attacks of colic, especially if the calculus has become quiescent.

The previous history of the attacks, with their intervals, is very valuable when the information is given by intelligent persons. With a series of attacks extending over a period of months or years,

with a shortening interval between the attacks, and pain localized during the acute colic lower and lower down, with at first no lumbar-ache, and finally, a persistent lumbar-ache, or ureteral and vesical symptoms intermingled, the picture is complete of the progress of a calculus down the ureter, and it becomes almost certain if to this history and symptoms that are confirmatory is added the presence of occasional traces of blood. But even with so typical a history and the subsidence of symptoms it is impossible to say that a calculus was ever present, or if present, that it has not passed undetected.

Such a history or even a partial history with many symptoms lacking, in the presence of a small stone detected by the Röntgen method, is sufficient evidence upon which to base a rational course of treatment. If the urinalysis shows that a normal amount of urea is being excreted; if the attacks have been intense and if a lumbar-ache persists, there is evidence that nature is attempting to expel the calculus, that the patient is in no immediate danger due to suspension of functional activity, and that the kidney and ureter still possess sufficient contractile power to expel the stone.

If, on the other hand, the calculus is large and frequently repeated attacks of colic fail to produce any change in its location, or if infection is present, or acute symptoms develop, or the amount of urea becomes persistently low, the indications for the immediate removal of the calculus are present.

The detection of a large calculus in the kidney is an indication for operation unless the calculus is producing but few symptoms and the age of the patient or any physical disability, makes the operative risk grave.

A small calculus in the kidney without complications, where there has been but one or two colic attacks, may be permitted to remain, as they are frequently passed, one patient passing a small calculus from the kidney and out of the bladder on the day set for operation.

The tolerance of the kidney and ureter for small sterile calculi, is so fully demonstrated by many cases that have passed numerous calculi in series, that the detection of a calculus is not an indi-

cation in itself for operation. Multiple calculi, either in both ureters or in the kidney and ureter, are indications for primary operative removal of the calculus in the ureter. Multiple calculi detected in one ureter have all been passed in two or more cases. The mortality in ureter-lithotomy is high; especially for calculi situated below the iliac artery, and in the presence of twenty-eight cases of ureteral calculus that have passed the calculi after the patients were put upon the expectant treatment, operation seems to be justified only in the advent of acute symptoms, or where both urinary tracts are involved.

As I have said in a former paper (*Lancet*, London, June 17, 1905): "While the presence of an undetected calculus may be a grave danger and a menace to the integrity of the kidney, as soon as its exact size and location are known, that menace ceases unless there are symptoms present that indicate a progressive impairment of the function of the kidney. Comparatively few migrating calculi give rise to anuria, or a greater proportion of patients suffering from ureteral stone would die."

With the knowledge that so many patients pass calculi and an accurate method of determining their size and location, it is rational therapy to permit nature to accomplish that which she has accomplished in a large number of cases.

Because of the exact knowledge obtainable, the patient's safety can be guarded during such expectant treatment and operation can be directed to the seat of obstruction if it is needed. It is, however, irrational to operate because a calculus has been detected, unless it threatens the integrity and functional life of the kidney.

Although the same accuracy and detail have not been obtained in other pathologic conditions of the kidney, much that is valuable and assists materially in diagnosis can be secured in favorable cases. Thus, displacements, hydro- and pyro-nephroses and hypertrophies of the kidney have been demonstrated. Pus or debris filling the pelvis of the kidney have been detected and the pus has been washed out through the use of the ureteral catheter. Cysts external to the kidney and gross collections of pus in the cortex, as well as the more marked surgical kidney, have been recognized.

These refinements in diagnosis can be obtained only in favorable cases and by careful study of the negatives. It is not always possible to determine or distinguish one condition from another, and yet there is absolute evidence to the expert observer of a pathological condition.

In closing, it is perhaps worthy of note that in none of the 352 cases examined for a diseased condition of the kidney has any deleterious effect been observed as the result of the examination, with the exception of some instances of dermatitis among the earlier cases. No dermatitis has occurred during the past four years. The innocuousness of Röntgen examinations is apparently demonstrated by these cases with renal disease and the thousands of other cases examined without harmful results.

DISCUSSION.

Dr. John H. Gibbon: I was especially interested in the portion of Dr. Leonard's paper concerning the diagnosis and treatment of ureteral calculi. In the past year I have operated six times for this condition. Two of the cases I have reported (*Annals of Surgery*, May, 1906).

The first case was sent into the hospital as one of appendicitis, the attack having subsided. I doubted the diagnosis of appendicitis, but decided to open the abdomen and remove the appendix. The appendix had been the seat of a recent inflammation, but there was quite a large stone in the ureter just below the iliac vessels. This was removed by the combined intra-peritoneal and extra-peritoneal route.

The next patient was a woman sent into the hospital for appendicitis. In this case we were able to make a diagnosis of probable ureteral calculus based on the character of the pain and the frequency of microscopic blood in the urine. The patient was operated upon in the same way as the former case, by the combined route, and a small calculus removed from the ureter just below the iliac vessels. The first case also showed microscopic blood in the urine.

In the third case there was a large calculus lodged near the vesical orifice of the ureter, which had produced an enormous cystic kidney. The kidney was removed, and, at a second operation, the stone from the ureter by the extra-peritoneal route.

The fourth case was one in which the diagnosis was difficult, and yet the *x*-rays showed a distinct shadow in the region of the ureter which was thought

to be a calculus, but which proved to be a putty-like, tuberculous mass in the broad ligament.

The fifth case was one which was at first diagnosticated as renal colic and then as appendicitis. The diagnosis here was extremely difficult; the patient had persistent blood in the urine, with retention and none of the characteristic symptoms of appendicitis. He had, however, some distention of the abdomen on admission, and when this disappeared we thought a distinct mass could be felt in the right iliac region. At this stage I was sure that we were dealing with an appendical abscess which was in close contact with the ureter. An *x*-ray picture was made which showed an oblong shadow in the line of the ureter. We then shifted our diagnosis once more to ureteral calculus, and an extraperitoneal incision was made. An abscess was opened and a free intestinal concretion, the size and shape of the shadow shown in the *x*-ray picture, was removed. The appendix was removed.

In the sixth case the patient presented many of the symptoms of ureteral calculus, but on intraperitoneal exploration of the ureter no stone was found. The symptoms in this case were due to a cystic kidney. All of these patients made satisfactory recoveries after their operation.

I have seen a number of *x*-ray pictures which showed shadows resembling those of ureteral or renal calculi. I think the fifth case that I have mentioned, in which an intestinal concretion in the appendix threw a shadow, is rather unique. Phleboliths in the pelvic veins will also give a shadow closely resembling a calculus. The *x*-rays are invaluable as diagnostic means in these cases, but they are only one of the means that we have at hand, and no operation should be conducted on the *x*-ray findings alone; the clinical manifestations are just as important, or more so, and should always be taken into consideration with the *x*-ray plates.

It is needless to say that the interpretation of an *x*-rays plate can only be properly made after considerable experience.

Dr. James Tyson: I should have been glad to hear some allusion by Dr. Leonard to cases simulating stone. While the *x*-rays have been of incalculable value to us in many directions, they have not helped us in the discrimination of these cases. Cases occur in which are found all the symptoms of stone in which the *x*-ray examination is negative, although stone is actually present and found at operation. Such cases are gradually growing less numerous. The majority of the cases simulating stone in which the *x*-ray examination is negative are cases of pelvic pyelitis, and not a few are cases of what may be called pericapsulitis, in which there is unusual adhesion of the capsule to the substance of the organ and a corresponding adhesion of the capsule to the neighboring fat and tissue. This condition was present in three cases simulating stone which I recently reported, confirmed by operation. In two cases the adhesions were so firm that the delivery of the kidney was extremely difficult. It seems to me that we are justified, in quite a number of the cases simulating stone, in

concluding that pericapsulitis is present. What is most interesting in connection with the circumstance is that the condition was long ago described by Rayer in his great book on diseases of the kidney, published in 1827. It is also interesting to know that these cases of simulated stone are relieved by the operation of decapsulation.

Dr. John B. Roberts: It seems to me that in women Kelly's method of passing a small ureteral bougie covered with wax up into the ureter, and seeing on withdrawal whether it is scratched by a stone, may, at times, be of great service. This requires great dexterity, which many of us do not possess.

Dr. Robert N. Willson: I hoped Dr. Roberts would refer to a case which he was kind enough to see with me some time ago, and in which there was a question whether the condition present was renal stone or floating kidney, and in which the point in question is not yet determined. The skiagraph shows an absence of any indication of a concretion in either the ureter or kidney. The case has had periodic attacks of pain typical of renal colic, also pus and blood appearing in the urine, which would then clear up; again pus and blood would appear synchronously with attacks of colicky pain, and in addition a series of symptoms on which Dr. Beyea has recently laid stress, namely, attacks of gastroenteritis, with mucus and blood in the stools. A number of German writers explain this intestinal condition as one of sympathy, transmitted, probably, through the splanchnic plexus to the bowel. Dr. Roberts' opinion was that it might be a case of pure and simple neurasthenia, though I have felt in the lower abdomen a freely movable mass, which I have no shadow of doubt was a floating kidney.

I am also tempted to remind Dr. Leonard of a case which he *x*-rayed for me five or six years ago. The case was that of a young woman, aged thirty-two years. I was her fourteenth physician. She had had eight different operations performed for one abdominal condition. A diagnosis of floating kidney had been made, and later she had been operated upon for appendicitis. The appendix was not inflamed, and was accordingly allowed to remain in the abdomen. I then saw her at a time of abdominal colic, when she passed large quantities of pus and blood in the urine. Following this and succeeding attacks there was nearly normal urine, and again pus and blood would appear as before. I suspected that there was stone present. Dr. Leonard *x*-rayed the case and found what was then called an unsatisfactory plate, no calculus being apparent. She was then *x*-rayed at the German Hospital, and a very clear plate was obtained; again there was no evidence of a concretion. Dr. Deaver operated for me and found in the kidney and in a pocket, from which it would slip into the renal pelvis and back again, a stone more than one inch in length and three-quarters of an inch in thickness. I cite these two cases with a view to emphasizing the difficulty of the positive diagnosis of renal calculus, not by way of criticising the use of the *x*-rays, which in certain cases

will remove all doubt at once. Its failure to demonstrate the presence of a stone should not, however, be looked on as conclusive evidence of its absence.

Dr. Leonard, in closing, emphasized the fact that much more can be diagnosticated in reference to the kidney by the Röntgen method than it is possible to demonstrate to anyone but an expert in this method of diagnosis; that relief that is permanent often follows examinations, and yet no assignable cause for it had been demonstrated; that in spite of the diseased condition of the kidneys in all these cases no injurious effects have ever been noted as the result of the Röntgen method of diagnosis.

CASES ALLIED TO AMAUROTIC FAMILY IDIOCY.

APROPOS OF TWO PATIENTS, ONE OF WHOM PRESENTS AMONG OTHER STIGMATA POLYDACTYLISM OF THE FOUR EXTREMITIES.[1]

By ALFRED GORDON, M.D.

The disease described first in 1881 by Warren Tay and in 1887 by B. Sachs under the name of amaurotic family idiocy presents, as it is well known, the following characteristic features: A progressive mental weakness, inability to hold up the head, muscular wasting, and cachexia, which leads to a fatal termination at the age of two to three years; convulsions and exaggerated reflexes; amaurosis with changes in the eyegrounds. The latter show the presence of a white-bluish area in the macular region, in the centre of which there is a cherry-red spot. The occurrence of the affection in early infancy in individuals of the same family and curiously enough in Hebrews of Russian extraction, are additional typical points of this bizarre disease. According to the majority of observers, the pathological condition of the affection consists essentially of a primary cell alteration in the entire nervous system, but chiefly in the cortex. Secondary degeneration of tracts have been reported by many writers, but not by all. The degeneration of the tracts is comparatively small, so that it differs greatly from that found in other affections, as diplegia, cerebral hemorrhage, etc. It must, therefore, be considered as an affection *sui generis*.

The macroscopic appearance of the brain has been different in the reported cases. Sachs found in his first two cases defective

[1] Read December 5, 1906.

development and in each of his three cases the brains were sclerosed. Other authors failed to find gross changes.

Sifting all the data recorded by competent observers, one must agree with the opinion recently advanced by Poynton, Parsons and Holmes (*Brain*, 1906, No. 114), as well as by Russel and Kingdon, that the disease is not due to an arrested development, but to a degenerative inherent condition, primarily of the cells and secondarily of the entire neurons.

The clinical picture, as described above, is not always present in its entirety. The symptoms which may be absent are: Spasticity or increased reflexes or convulsions; eye symptoms, the family character, the mental deficiency, and finally, the early death—features indispensable to constitute the type of amaurotic family idiocy. On the other hand, there are cases which, although they do not present all the important symptoms of that affection, show, nevertheless, the majority of them and must, therefore, be considered as allied to that disease. Spielmeyer, for example, describes a special form of amaurotic family idiocy (*Neurologisches Centralbl.*, 1906), in which mental weakness, blindness, and the family character were the only symptoms common with Tay-Sach's disease. In his case only, at the age of six years, there began to develop mental deficiency together with retinitis pigmentosa.

The patients lived until the age of puberty, when death occurred from intercurrent diseases.

Two of Spielmeyer's cases came under autopsy and the pathological changes were found to be confined to the cells; the alteration of the nerve fibers was slight. The cells showed swelling and a peculiar granular substance.

Comparing this condition with the cellular alteration in Tay-Sachs' disease, that is, excessive growth of protoplasma which later undergoes degeneration, we must conclude that the anology is very great. Spiller (*Amer. Jour. Med. Sci.*, 1905) also speaks of a case which was not quite typical of amaurotic family idiocy, but in which cellular changes were found; this patient lived till eight years of age.

Taking into consideration the variations of the anatomical findings, also of the clinical pictures in all cases reported, one must say that amaurotic family idiocy presents several forms more or less different from the original type.

The two cases I am about to report are allied, I believe, to Tay-Sachs' disease by the following peculiarities: The blindness, with which they are affected, was noticed very early in life; now the girl is totally blind, the boy to a great extent. The mental deficiency was noticed since infancy, especially in the girl. The two patients are brother and sister and they are offsprings of Russian Hebrews. While the changes of the eye-grounds are not entirely typical of the amaurotic family idiocy by reason of the absence of the cherry-red spot in the macula, nevertheless, optic atrophy, which is present here, was stated in the majority, if not in all cases of that disease.

Clinically, my cases, similar to Spielmeyer's (see above), belong to the same category and they can all be considered as forms of the same great group of affections called in a general term, "amaurotic family idiocy."

The symptoms observed in this affection during life are external manifestations of the anatomical degenerative condition of the cortical cells. They will vary according to the degree, extent and character of the degeneration. In my two patients, the stigmata of degeneration are far more extensive than in Tay-Sachs' form or in Spielmeyer's form. The boy, for example, presents among many other stigmata, a very unusual anomaly, viz., polydactylism of all four extremities.

Various views have been advanced by authors to explain the cause of the degenerative state of the cells in Tay-Sachs' disease. So far none are absolutely satisfactory. A suggestion forces itself upon us, since our studies of the internal secretions in the organism appear to clear up many obscure phenomena. It is possible that some profound anomalies in the structure and function of the ductless glands are the real cause of the diffuse anomalous condition of the cells of the nervous system. Authors who reported cases of amaurotic family idiocy do not mention such a possibility

and among all the records in the literature at my disposal, I found only two in which postmortem examination embraced also the ductless glands. They are: McKee's case (*Amer. Jour. Med. Sci.*, 1905), in which the thymus was small, and Peterson's case (*Jour. of Nervous and Mental Dis.*, 1898), in which the suprarenals were pale, yellow, firm, and had a small cavity in the centre. It is regrettable that similar examinations have not been made by others and that their investigations have been confined exclusively to the nervous system. At all events, the idea is highly suggestive.

My two patients are interesting from this standpoint: They both show distinct changes in the thyroid gland; in one the gland is enlarged, in the other it is not palpable.

The histories of the cases are as follows:

Case I.—Harry F., aged nine years, was born at term and normally; the delivery was without instruments. At the age of ten months had a mild attack of diphtheria. He began to walk at nine months and speak at two years. When he was twelve months old the mother noticed he could not see well. For a long time he behaved like an infant. It was extremely difficult to teach him anything. At the age of five he was sent to school, which he has been attending regularly since, but he is still in the first grade. At present he is very childish, takes interest in things not corresponding to his age, talks and acts like a boy whose mentality is below the average. Nevertheless, according to the mother, he has improved considerably. As to his physical condition he presents the following symptoms: Very marked obesity; he began to grow stout at the age of three years. The adiposis is constantly increasing in spite of the fact that the boy eats extremely little; the quantity of food is so small that the mother at times becomes alarmed. While the face is very full, the upper part of the head is small and out of proportion with the rest. The forehead is low and narrow. The ears are unequal in size: the right is a quarter of an inch larger than the left; the latter is also somewhat lower than the right. The palate is narrow and presents a high arch. The teeth are irregular and abnormal in size; in the upper jaw the two incisors are normal, but the others also very small and decayed. The thyroid gland cannot be felt. There is also cryptorchidia; the right testicle is not descended. The penis is infantile.

The boy walks normally and presents no rigidity or deformities in the extremities. The reflexes are normal. There is a slight instability of the head; it is animated with slight jerky and tic-like movements. The condition of the eyes is as follows: (Report made by Dr. H. F. Hansell.)

V. 6/200 in each eye, improved in R. E. to 18/200 by —3.25 ⌒ —1.50 cy. ax. 180°; in L. E. to 20/200 by —3.25 ⌒ —2.00 cy. ax. 180°. Divergence of right. Rotatory nystagmus. Rotation in all directions limited but not absent. Pupils equal and react. Optic disks pale. Large irregularly outlined patch of absorption of choroidal pigment in each, not symmetrically placed. Choroidal vessels too evident in all parts of fundus. Partial atrophy of optic nerves and retinæ.

The most remarkable and unusual feature of the case is the polydactylism. There are six fingers on each hand and six toes on each foot. As it is shown by the *x*-rays picture taken by Dr. Manges, the supernumerary fingers are added to the last finger of both hands. The manner of attachment of the sixth finger and of the sixth toe to the metacarpal and metatarsal bones respectively, and other details of the changes in the latter bones are well illustrated on the pictures, so that an additional description appear to be superfluous.

Case II.—Pearl F., thirteen years of age, sister of the first patient, was born at term after a protracted labor (no instrumental delivery). She began to talk and walk at the age of three years. At about the same time her blindness was noticed by her parents. Contrary to her brother, she was very large at birth. Her adiposis began to grow rapidly since then. The development of her mentality was much slower than that of Harry. Her speech was always deficient. At present her actions and manner are those of a very young child. Her answers are foolish, inconsistent. Spends her time in playing with dolls and is extremely apathetic. Has been going to school for the last six years and is still in the second grade. Cannot do simple additions or multiplications. The physical symptoms are as follows:

The adiposis is extremely pronounced. Her mammæ are well developed. Began to menstruate at twelve years. Has an enormous appetite, is never satisfied with any amount of food. The forehead is low and the scalp is very thick. The lobes of both ears are attached to the head. The teeth of the upper jaw are widely separated and deficient. The thyroid gland is somewhat enlarged. The gait and station are normal. No rigidity of the limbs. The knee-jerks are increased, but there is no other abnormal reflex. The speech is deficient. The pronunciation and articulation of words are not distinct. The intonation of the voice is nasal (the nose and throat examination is negative). The eye examination made by Dr. Hansell shows the following:

V.=Counting fingers at five feet. Fields apparently concentrically limited. Rotation of balls restricted in all directions. Media clear. Optic nerves and retinæ atrophied; oval area including fovea and about size of papilla, much redder than remainder of fundus. Pupils equal and react readily.

DISCUSSION.

Dr. F. X. Dercum: I have always felt that the frame first outlined by Dr. Sachs, in which he places amaurotic idiocy, would have to be enlarged to comprise other cases. His early cases were, I believe, in younger children, and all died in infancy.

I am in accord with Dr. Gordon in that we have here two factors to consider: first, a morphological factor as shown by the signs of arrested development, and, second, a factor of chronic autointoxication. In some of the pathological studies that have been made the behavior of the nerve cells strongly suggests the action of a poison, *e. g.*, the lateral displacement of the nucleus or the extension of the nucleus. A possible explanation is that the poison is produced in the body; perhaps it is the result of grossly defective metabolism or of the faulty action of abnormal ductless glands.

Dr. Hansell: Examination of the eyes of these two children showed in each myopia of about 10 D., atrophy of the choroid with absorption of the pigment of both retina and choroid, and partial atrophy of optic nerves and retina, and in the girl the presence of an oval area involving the foveal region, of a deep red color, and about the size of the papilla. These changes suggest one of three possible diagnoses: high myopia, with the choroidal atrophy so frequently found; the chronic choroiditis and retinal atrophy of congenital glaucoma, or, finally, amaurotic family idiocy. I believe the myopia to be secondary to the structural alterations in the coats of the eye, and not the primary condition, and glaucoma may be dismissed from consideration because of the absence of increased tension and cupping of the optic nerves. Optic nerve and retinal atrophy associated with mental deficiency and physical stigmata of degeneration, and, in the case of the girl, with highly colored areas in the fovea, might be correctly interpreted as indicative of amaurotic family idiocy in a modified form.

Dr. Walter L. Pyle: Speaking of this case purely from the side of teratology, I desire to call attention to its rarity. In preparing a work on anomalies of medicine ten or more years ago, I had occasion to examine the records of the most striking examples of the minor terata in ancient and modern medical literature, and I am sure that there are very few cases recorded in which there was such perfect polydactylism on all four extremities as that shown in Dr. Gordon's case.

Dr. F. X. Dercum: I do not think that Dr. Gordon stated polydactylism to be a frequent symptom of amaurotic family idiocy. It is merely a stigma of degeneracy, and as such is in keeping with the other morphological features presented by these cases.

Dr. Gordon closes: I did not say that polydactylism was a frequent symptom of amaurotic family idiocy, but pointed out that it was one of the many stigmata of degeneracy which the condition presents.

A CASE OF EXTENSIVE LEUKOPLAKIA BEGINNING IN CHILDHOOD, ACCOMPANIED IN THE EARLY STAGES BY FOLLICULAR KERATOSIS OF THE SKIN, AND FOLLOWED BY CARCINOMA OF THE TONGUE.[1]

By M. B. HARTZELL, M.D.,
ASSOCIATE IN DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA; DERMATOLOGIST TO THE PHILADELPHIA HOSPITAL.

While, as a rule, leukoplakia must be regarded as a strictly local affection due to some locally acting cause, yet, in exceptional cases, it seems probable that it is but the local expression of a wide-spread tendency on the part of the epithelium to increased cornification resulting from some constitutional fault, congenital or acquired. In the following case an extensive buccal leukoplakia was apparently only a part of a wide-spread disturbance of the process of keratinization, since the skin, as well as the buccal mucous membrane, was affected.

Miss X., at that time a girl eleven years old, was brought to me in December, 1891, on account of an affection of the skin which consisted of irregular-shaped, various-sized patches of dirty-gray spines situated upon the sides of the neck, and hemp-seed-sized, flat, slightly elevated, scaly lesions scattered over the back. The spines upon the neck projected considerably above the surface of the skin, giving it a grater-like feel, and were evidently situated in the dilated mouths of the sebaceous gland ducts, from which they could readily be extracted with forceps. The exact nature of the lesions upon the back was somewhat less apparent, but they were regarded as also keratosic. Unfortunately, the one excised for microscopic examination was lost before the examination was

[1] Read December 5, 1906.

completed. In addition to the cutaneous disease the entire mucous membrane of the lips, tongue, and cheeks was a bluish-white, looking as if painted over with a strong solution of nitrate of silver. The disease of the skin, which was slowly spreading to new regions, had lasted eighteen months; the duration of the leukoplakia was somewhat uncertain, but it had lasted for a considerable time. After local treatment extending over a period of ten months, which consisted chiefly in the application of fairly strong ointments of salicylic acid and pyrogallol, the latter being used only on the back, the skin affection disappeared; but the leukoplakia, for which mouth-washes of various kinds had been prescribed, changed but little, if at all. With the disappearance of the eruption upon the skin the patient was seen infrequently and only at long intervals, and the treatment of the disease of the mouth was soon practically abandoned, as it gave the patient little or no annoyance. In February, 1906, she again came under observation complaining of some soreness of the tongue and of a lump upon the side of it. Inspection revealed extensive and marked disease; the entire surface of the tongue was a yellowish-white, with, here and there, irregular areas of superficial ulceration, and a small wart-like nodule upon the right side posteriorly. A diagnosis of epithelioma having been made, the patient was referred to a well-known surgeon, who, agreeing in this diagnosis, advised the removal of half the tongue, which was done a few weeks later. Unfortunately, after doing well for twenty-four hours, she died suddenly, and most unexpectedly from what was supposed to have been pulmonary embolism, but as no autopsy was performed the cause of death must remain somewhat uncertain.

Microscopical examination of the nodule on the side of the tongue fully confirmed the clinical diagnosis of epithelioma. Long, branching, and anastomosing processes of squamous epithelium extended from the epidermis deeply into the corium, and here and there were rounded and oval masses of epithelial cells containing numerous pearly bodies, the whole presentig an characteristic picture. Other portions of the tongue presented interesting microscopical changes. The entire epidermis showed pathological alterations; in certain areas there was a marked increase in its corneous layer, while the rete mucosum was everywhere thicker than normal. Here and there the interpapillary prolongations of this latter layer were greatly enlarged in all directions, extending an unusual distance downward into the corium, representing, probably, a very early stage in the transformation of the morbid process into carcinoma. Immediately beneath the epidermis there was an abundant cellular infiltrate, made up, for the most part, of polynuclear leukocytes, but also containing many plasma cells and an unusual number of small "mastzellen." This cellular infiltrate was most marked where the alteration of the epidermis was greatest and was present to a greater or less degree in all the sections examined; indeed, the entire tongue showed evidences of an extensive glossitis of moderate severity.

Apart from the unusual association of keratosis of the skin and mucous membranes, the case presents other features of more than common interest. The early age at which the leukoplakia began is most unusual. Mr. Butlin, in his well-known treatise on *Diseases of the Tongue,* states that this affection is practically unknown before the age of twenty, and is very rare in women. As already noted, my patient was of the female sex and was only eleven years old when first seen, and it is quite certain that the leukoplakia had already existed for a considerable time. The occurrence of carcinoma of the tongue in an individual so young (twenty-six years old) is also decidedly rare. Of eighty patients with cancer of the tongue observed by Mr. Butlin, but two were under thirty years of age.

Cases of the kind just reported are rare in literature, but it is not likely that the number of published cases represents, even approximately, the frequency with which leukoplakia is associated with keratosis of the skin, since, owing to the absence of annoying subjective symptoms, mild degrees of the latter readily escape the notice of both patient and physician. Morrow, some years ago (*Journal of Cutaneous and Venereal Diseases,* 1886), reported the case of a sailor, thirty-one years old, in whom, along with a very extensive follicular keratosis, the entire follicular apparatus of the skin being involved, there was a marked leukoplakia of the tongue with fissuring, the disease having lasted five years.

While this peculiar form of keratosis is observed most frequently in the mouth, it is not limited to this region, but may occur upon other mucous membranes adjoining the skin, such as the vulvovaginal, the anorectal, and especially the balano-preputial, presenting the same appearances found in the buccal and lingual mucous membranes and pursuing the same course.

The proportion of cases in which carcinoma follows leukoplakia is large. In the series of eighty cases of cancer of the tongue already referred to, Mr. Butlin found that a more or less marked leukoplakia had preceded the appearance of the cancer in 20 per cent., and this author believes that the frequency of this sequel is under-estimated rather than over-estimated.

Owing to the frequency with which it is followed by malignant disease more definite and exact knowledge of its etiology than we possess at present is greatly to be desired. Smoking and syphilis are the two etiological factors to which it is most commonly attributed, but it seems to me very doubtful whether any considerable number of cases arise from these causes; it is much more likely that any frequently repeated or long continued irritation, joined with a special tendency on the part of the epithelium to hyperkeratosis, may produce it. That it is, in the beginning at least, an inflammatory affection is quite evident from a study of its histopathology, but it is equally evident that the inflammation must possess some special characters, since ordinary inflammatory processes do not give rise to keratosis and carcinoma.

Leukoplakia is notoriously rebellious to treatment, and very few of the many local applications recommended in the text-books produce any perceptible improvement. For this reason it seems to me worth while to call attention to two remedies which have been of real service in my hands in the past year or two. These two remedies are weak ointments of salicylic acid, 3 to 5 grains to the ounce, applied several times a day, and the *x*-rays, the latter having proved especially beneficial in two cases. In a long standing and very marked case affecting the mucous membrane of the lower lip, in which there were several small, thick, horny patches and superficial ulceration, the careful use of the *x*-rays was followed speedily by a complete cure. I feel, however, in recommending this agent, that I should urge the utmost care in its use, since the mucous membranes are extremely susceptible to the action of the rays, and too long exposures or too frequent repetition will surely do harm. The duration of the exposures should rarely exceed three minutes, and they should not be repeated oftener than every five days.

APPENDIX.

AN ACCOUNT OF THE LIBRARY OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.[1]

By CHARLES PERRY FISHER,
LIBRARIAN.

In preparing the following account of the Library of the College of Physicians of Philadelphia, the facts stated in regard to its early history have been taken chiefly from the admirable Reports of the late Drs. W. S. W. Ruschenberger and Alfred Stillé, contained in the Centennial volume of the College of Physicians published in 1887.

The record of the society shows that the question of forming a library was first formally considered in 1788. A committee was appointed in reference to the matter June 3, and its report laid on the table July 1. It was resolved, August 5, "That the several members of the College be requested to send to the Secretary such books as they mean to present to the College."

In December, Dr. John Morgan presented 24 volumes and added others in January, 1789.

The committee appointed June 3, 1788, to prepare a plan for the formation of a library submitted the following, which was adopted March 3, 1789:

First. That the business of collecting books from the members, by way of donation to the Library, of procuring a suitable place for keeping them, and a person to attend at stated times for lending them to the members, be committed to the Censors and Secretary, who shall consult the College respecting the time and manner of lending them.

Second. That on the first Tuesday of July of every year, as soon as the Treasurer has made his annual report of the balance remaining in his hands,

[1] Prepared and printed in accordance with a "Resolution" passed by the College, January 2, 1907.

the College do grant such sums as they may think proper for the service of the Library for the ensuing year.

The primary enactments distinctly imply that the acquisition of a suitable Library was very desirable in the opinion of the College.

In October, 1789, Dr. William Shippen presented the works of five authors, Dr. John Morris eight volumes, and Dr. John Jones several. In November the President was authorized to draw fifty pounds ($233) for the purchase of books. Some were imported in 1790. In 1793 Dr. Rush presented a copy of Sydenham's works. A copy of the catalogue of the Library of the Pennsylvania Hospital was received from Dr. Parke; and the pamphlets of the College were ordered to be bound in 1794. In 1795 Dr. Parke sent thirty-five pounds to purchase books and reported, August 4, the receipt of twelve volumes from London. July 5, 1796, a hundred and twenty dollars was appropriated for the use of the Library, and the Censors were directed, August 5, to prepare a list of books to be procured in Europe. Books purchased in Amsterdam arrived in 1797; and books of nineteen titles, submitted by the Censors, were ordered. In 1798 the Censors were directed to prepare a list to be purchased. Between June, 1800, and July, 1818, additions to the Library were made by gift and purchase every year. The Censors reported, July 7, that some volumes were missing, and recommended that a catalogue be made. The committee appointed for the duty, Drs. William Currie, Samuel P. Griffitts and Thomas T. Hewson, reported, January 5, 1819, that the catalogue had been completed.

The number of books increased slowly. In 1825 the Library of the Kappa Lambda Society was deposited in the College. On their report the Censors were directed, November 28, 1828, to have the bookcases repaired.

The Library Committee stated, January 6, 1835, that the Library was in bad condition, going to decay, and was instructed to take measures for its preservation.

The committee reported, June 7, 1836, that besides a number of unbound pamphlets, the Library contained 291 volumes—namely, 31 folios, 67 quartos and 193 octavos—and was in condition for use were it more conveniently placed.

According to the annual reports of the Library Committee from this date until the close of 1843 very few volumes had been added, and the Library was "rarely if ever used."

In May, 1844, the medical library of Dr. Otto was purchased for $200, and in July placed in a room over the office of Dr. Hodge, northwest corner of Walnut and Ninth Streets. June 4 an appropriation of $50, to arrange and catalogue the Library, was made; and the Library Committee recommended that a librarian be present one hour twice a month to loan books.

The committee reported, June 3, 1845, that one case of books stood on the landing of the stairway leading to "our room;" that the Otto collection

was at Dr. Hodge's office, and that the Library was very little used. Drs. Bond, Condie, Parrish, and Wood had presented 137 volumes during the year.

It was ordered, August 5, that the Library should be open from 11 o'clock A.M. until 2 o'clock P.M. Most of the medical periodicals published in the United States, and one from Canada, were received in exchange for the TRANSACTIONS of the College.

The Philadelphia Medical Society deposited its library in the College December 1, 1846, and claimed its restoration December 7, 1859. During this period the books were accessible to the Fellows of the College.

The committee reported, March 6, 1849, that the Library continued "to steadily increase," and "was entitled to more attention than it received."

June 6, 1855. The committee reported that soon after the removal to Spruce Street the Library had been rearranged and catalogued, and that 350 volumes had been added during the past year.

December 5. Mrs. Moreton Stillé presented 119 volumes as a "memorial of her late husband."

January 2, 1856. $125 was appropriated for binding, and the same sum for the use of the Library January 7, 1857.

November 4. The committee reported the receipt of more than 900 volumes from Dr. Thos. F. Betton, including some rare and important works; and December 1, 1858, that the Library contained about 3560 volumes, and during the past year had been much more frequently consulted. The Betton collection numbered 1265 volumes.

May 4, 1859. Ordered that the Library be open one evening in the week.

June 1. A selection of books from the library of Dr. Bond, bequeathed by him, had been received.

December 7. The committee reported that Mrs. Mütter had deposited forty works; that 397 volumes had been contributed during the year, and that the Library contained about 4000 volumes, besides pamphlets.

December 3, 1862. The State Medical Society presented a complete set of its Transactions, and Fellows of the College 192 volumes of French theses.

January 7, 1863. The executors of Dr. Isaac Remington presented ninety works, including 195 volumes, and 188 numbers of ten periodicals.

The Library Committee was authorized to move into the new building.

November 4. Ordered that cases be prepared to receive books to be presented by Dr. Samuel Lewis. The Librarian reported the receipt of a large number of books from Dr. Thos. F. Betton.

The most important epoch in the history of the library was the founding of the Lewis Library, in 1864, which at once added to it more than 2500 volumes of the choicest works, in the finest condition. This collection had the constant care and attention of Dr. Lewis, and by the additions made through his own generosity, and the gifts of his many friends, had increased to 11,205 volumes at the time of his death, November 26, 1890.

September 25, 1865. Mr. George Ord presented his general library to the College. Mr. Ord died before the library was delivered and the College paid $330 collateral inheritance tax on its appraised value in February 1866. Subsequently, July 5, 1882, these books were sold for $550.

April 4, 1866. Dr. George B. Wood agreed to give $500 annually to enable the College to employ a librarian in order that the Library might be open daily.

It may be well to state here that the Library was in charge of the Censors until 1834. Then the standing committee on the Library was created, the chairman of which was regarded as librarian. The office was created in 1854 and the first librarian elected January 3, 1855.

March 4, 1868. It was ordered that $500 be invested, including a donation of $445.90 from the Philadelphia Medical Society. This was practically the foundation of what may now be called the Library Endowment Fund, the income to be used for the purchase of books and various periodical publications.

March, 1871. A Journal Association was formed which has continued to the present time. Its subscriptions, limited by its means, are confined to a few of the best periodicals published in English, French, and German. Complete files of each journal are on the shelves of the library.

November 5, 1880. Dr. S. Weir Mitchell presented $1000. The Treasurer was directed to invest the gift and keep it separate under the title of the Weir Mitchell Library Fund. This fund was increased to $5000 by further gifts from Dr. Mitchell.

February 20, 1881. The services of competent cataloguers were engaged and a card catalogue commenced.

In 1882 the Ordinances and By-laws of the College were amended and the word Honorary placed before Librarian. The Honorary Librarian to be a member of the Council and *ex-officio* a member of the Library Committee.

April 15, 1882. The card catalogue, authors and subjects, for the Lewis Library was completed and in use.

In 1882 the first bookcases were erected in the present meeting-room of the College and the Lewis Library, which had outgrown its quarters, moved to the old meeting-room.

During this year the libraries of the late Drs. Charles D. Meigs, John Forsyth Meigs, R. M. Bertolet and William F. Jenks were received.

January 3, 1883. Dr. James H. Hutchinson was elected the first Honorary Librarian. The Library Committee was instructed to appoint an Assistant Librarian annually in January, and report the appointment to the College, the salary of the Assistant Librarian to be such as the College may from time to time determine.

In 1884 the gallery and additional book cases were erected in the meeting-room and the Samuel D. Gross Library of the Philadelphia Academy of Surgery, 5128 volumes, accepted as a "permanent deposit" and placed in the

room formerly occupied by the Lewis Library. The library of the late Dr. H. Lenox Hodge, known as the "Hodge Collection," 1665 volumes, was also accepted as a deposit during 1884, and ultimately became the property of the College as a gift from Dr. Hodge's son.

In 1885 the balance of the wall-space in the meeting-room of the College was filled with bookcases.

901 volumes were presented by Dr. I. Minis Hays during this year.

The Library Committee reported that the card catalogue of the entire library had been completed with the exception of the periodicals, unbound reports, transactions, and the pamphlets.

In 1886 Mrs. Weightman presented the Library of her husband, the late Dr. John F. Weightman, 512 volumes, and the sum of $1000. The money to be invested and the income used for the purchase of books relating to ophthalmology.

The Library of the Obstetrical Society of Philadelphia was accepted as a "permanent deposit."

This year the Library Committee reported to the College that for lack of shelf-room about 1500 volumes were tied in bundles and packed on top of the cases.

In 1887 the library of the late Dr. N. Archer Randolph, 466 volumes, was presented to the College. During this year, in pursuance with an agreement, all books of the S. D. Gross Library other than anatomical, surgical, and special works indicated, that duplicated the books in the Library of the College; and all the books that were duplicates in the collection received from the Obstetrical Society of Philadelphia were thrown out; these, together with the duplicates belonging to the College, were catalogued and priced. This catalogue was printed and distributed, and the entire collection disposed of. The S. D. Gross Library received $640.75 and the Obstetrical Library $145.90. This money was used for the purchase of new books with the exception of a small portion expended for bookcases for the S. D. Gross Library.

The question of classification was considered and the plan of the Librarian of the Surgeon-General's Office was, with certain modifications, adopted.

In 1888 bookcases were built in the lower west meeting-room.

In 1889 a gallery was erected in the lower west meeting-room; this was filled with bookcases and an iron spiral stairway built from the ground floor to the reading-room, in the second story.

By resolution of the College the books belonging to the late Dr. S. W. Gross were deposited in the S. D. Gross Library.

The Librarian obtained subscriptions to form a "New Book Fund," with authority to purchase books at the request of three of the subscribers. This fund has been continued, and between 30 and 50 new books added to the library each year.

In 1890 Dr. Frederick P. Henry was elected Honorary Librarian to succeed the late Dr. James H. Hutchinson.

The Library Committee asked permission of the College to use the lower east room for book-stacks.

In 1891 Mrs. Deborah K. Rodman made a gift to the College of $5000, to be paid within five years, in memory of her late husband, Dr. Lewis Rodman, the income derived to be used for the purchase of books. This money was invested and is known as the Lewis Rodman Library Fund.

In 1892 iron book-stacks were erected in the lower east room. The lower tier, covering the entire floor space, cost $1680.

In 1894 Mr. Clement A. Griscom presented $5000, to be known as the John D. Griscom Book Fund, the income to be used for the purchase of books.

This year the Committee purchased 796 French and German dissertations for $144.46, and 377 volumes of foreign journals at a cost of $282.60.

In 1895, 294 volumes of foreign journals were purchased at a cost of $425.30. In the two years, 1894 and 1895, the Committee, with an expenditure of $807.90, completed the files of thirty-three of the most important French and German periodicals.

In 1896 the College passed a resolution offered by Dr. F. P. Henry; and the President appointed a Committee of fourteen Fellows "to obtain subscriptions from the general public toward a Fund for the Endowment of the Library." This Committee asked to be discharged in January, 1897.

During 1896 and 1897, Dr. J. M. Da Costa purchased and presented to the Library 293 volumes needed to fill in gaps in the files of various valuable foreign periodicals.

In 1898 a second tier of iron book-stacks, with glass floor, and iron staircase leading to the Lewis Library, was erected at a cost of $1593.60. This amount was subscribed by the Fellows of the College.

In 1899, Dr. George Fales Baker presented $5000, to be known as the Henrietta Rush Fales Baker Library Fund, the income to be used for the purchase of books.

Mrs. Elizabeth B. Judson presented $1000, this amount to be invested and known as the Oliver A. Judson Fund, and the income to be used for the purchase of books relating to preventive medicine.

During this year the results of Dr. Henry's "Resolution," adopted in 1896, became evident. Many subscriptions were obtained by the Fellows from the general public for the "Library Endowment Fund." As a number of these subscriptions were promised contingent with $50,000 being raised by July 1, 1900, additional effort was required. Dr. Keen assumed the burden of this responsibility, and it is due to his untiring efforts that the required amount was obtained within the time limit.

The entire Library Endowment Fund at the present time, the income from which is used for the purchase of books and journals, amounts to $60,965. Included in this amount are the following funds:

Henrietta Rush Fales Baker Fund.
Luther S. Bent Fund.
William T. Carter Fund.
John D. Griscom Fund.
William F. Jenks Fund.
Oliver A. Judson Fund.
William W. Keen Fund.
William V. and John M. Keating Fund.
Weir Mitchell Fund.
Philadelphia Medical Society Fund.
Lewis Rodman Fund.
John F. Weightman Fund.
Caspar Wistar Fund.

And under the title of "Library Endowment Fund," the following is a list of the subscribers giving $1000, or over:

Mrs. Alice Gibson Brock.
Mr. John H. Converse.
Mr. William W. Frazier.
Mr. Charles C. Harrison.
Mrs. Sara Kohl.

In addition there is the George B. Wood Library Fund, the income from which is to be used for purposes other than the purchase of books or binding.

Toward the end of this year authority was given by the Library Committee for the expenditure necessary in an effort to obtain, by exchange, the French theses and German dissertations.

In 1900 the Library received 6963 theses and inaugural dissertations, and effected an exchange of publications with six universities: French, German, and Spanish. The greater part of these exchanges were obtained through the personal solicitation of the President of the College, Dr. W. W. Keen.

The library of the late Dr. J. M. Da Costa, 2466 volumes, in splendid condition and containing many elegantly bound books, was presented to the College.

During this year the Librarian called the attention of the Committee to the card catalogue; its soiled and worn condition owing to the irregularity in the size of the cards, and the lack of uniformity in the subject headings; and explained the desirability of a type-written card of uniform size, with the subject headings revised to conform with the Index Catalogue of the Library of the Surgeon-General's Office, and with the modern "tray-cases" to hold the cards. The Library Committee brought this matter to the attention of the College, and later a Committee was appointed to obtain, by subscription, $2500 for the revision of the Catalogue. $1900 was obtained by this Committee before it was discharged.

In 1901 the College received as a bequest from Dr. John Ashhurst, Jr., 1500 volumes to be selected from his library. Many rare and valuable books were added to the shelves by this bequest.

207 volumes were received from the late Dr. Alfred Stillé, comprising, chiefly, the books used by Dr. Stillé in his work on the revision of the "National

Dispensatory." Some years before the death of Dr. Samuel Lewis, Dr. Stillé had presented, practically, his entire collection of medical books to the Lewis Library of the College, numbering more than 1000 volumes.

The largest and most valuable purchase made for the Library, since its foundation, was that accomplished by the Library Committee in April, 1901, when, with the aid of subscriptions from Drs. George Fales Baker, John K. Mitchell, and S. Weir Mitchell, they acquired the library of the late Dr. J. Stockton Hough; a unique collection numbering 3247 volumes and 2070 pamphlets. 1500 volumes and 1039 pamphlets were retained, and the duplicates and non-medical books of the collection were disposed of to the Library of the University of Pennsylvania for $1500.

Work on the revision of the catalogue was commenced during the latter part of this year, the number of cards revised and type-written for four months being 7690.

In 1902 the library of the late Dr. William F. Norris, 1177 volumes, one of the most valuable collections of works on ophthalmology in this country, was presented by his family.

A little more shelf room was obtained this year by dividing the toilet-room into an upper and lower part and using the upper half for the storage of books.

The annual report on "Revision of Catalogue" showed that the character of this work would require greater attention than had been at first given to it, and that a much longer time and more funds would be required to complete it.

A gift worthy of special mention was made to the Library in October, 1903, by Dr. George W. Norris, consisting of three volumes containing the collection of colored eye-grounds made up of the original drawings and notes of Prof. Edward Jaeger, of Vienna, from which the well-known "Jaeger Atlas" was produced. The drawings were all made by Jaeger himself. This collection was sold after Dr. Jaeger's death by order of his executors and was purchased by the late Dr. William Fisher Norris for $2400; and also one volume containing the collection of ophthalmological drawings from cases seen in the practice of the late Dr. William F. Norris from 1873 to 1901. More than $1000 was paid by Dr. Norris to the artists in preparing these plates.

In 1904 the library of the late Dr. Thomas M. Drysdale, 958 volumes, was received.

In 1905 two large gifts of books are recorded: From the Board of Managers of the Episcopal Hospital of Philadelphia, 1982 volumes, and from Dr. James V. Ingham, 548 volumes.

Toward the end of this year the College authorized the Librarian to obtain, by subscription, sufficient funds to complete the "Revision of Catalogue." That this work is appreciated is evidenced by the fact that in less than eight weeks' time the Librarian has obtained, from the Fellows of the College, subscriptions amounting to about $4000, sufficient to complete the work. $2,931

cards had been revised and type-written at this time, not quite one-half of the entire catalogue.

The following table shows the increase in the Library at intervals of ten years after the commencement of its steady growth in 1866:

Year.	Volumes.	Pamphlets.	Dissertations.
1866	9,513		
1876	17,765		
1886	36,442	16,026	
1896	51,175	31,005	
1906	82,305	56,116	20,978

THE LIBRARY AS IT APPEARS TO-DAY.

The foregoing is a fairly complete chronicle of events in the history of the Library of the College of Physicians. It may appear strange that such familiar names as Drs. C. W. Dulles, R. J. Dunglison, H. A. Hare, W. W. Keen, S. Weir Mitchell, F. R. Packard, John B. Roberts, H. C. Wood, and others, whose gifts amount to hundreds of volumes, have not been mentioned; this is the case merely from the fact that their generosity has continued through many years. The same reason applies to the omission of the names of the Medical Publishers of Philadelphia, and the Editors of practically all the medical journals published in Philadelphia during more than half a century.

The following details are taken from the annual report of the Library Committee, for 1906, and show an accurate account of the contents of the Library at this time:

	Bound.	Unbound.	Unbound reports.	Unbound theses.	Unbound pamphs.
General Library . .	53,267	3439	8798	20,978	56,116
Lewis Library . . .	13,329	44			
S. D. Gross Library .	3,207	4			
Library of the Obstetrical Society of Philadelphia	217				

327 periodical publications are subscribed for by the Library.
62 periodical publications received in exchange.
61 periodical publications received from the Editors or Publishers.
278 exchanges of periodicals published in Philadelphia and sent to the Library at stated intervals.

Total of 728 current periodicals upon the journal racks of the Library.

Exchange of publications is now made with 19 foreign universities, and between 1000 and 1500 dissertations received each year—1433 for the year 1906.

The entire Library is catalogued with the exception of unbound pamphlets and dissertations: the pamphlets are classified the same as the books of the Library and arranged alphabetically by author under each class; the dissertations are arranged according to schools, then alphabetically by authors under the year. 103,883 cards have been revised, type-written and arranged in four sixty-drawer tray cases; about one-half of the work of the "Revision of the Catalogue" is completed. This work is considered one of the finest examples of type-written card indexes in existence.

The Library of the College of Physicians contains treasures enough for their description to fill a good-sized printed volume, and a very interesting volume it would be. A few facts only can be stated here:

There are 123 books printed before the year 1500, known as "Incunabula;" all rare; but a few of them are of such interest that their titles are given:

Valastus de Tarenta (Valescus de Taranta)—Tractatus de epidimia et peste. Argentorati, M. Flach [circa 1470]. [This is believed to be the first medical book printed.]

Simon Gennensis. Synonyma. Milan, 1473. [First edition of the first medical dictionary, and the earliest dated book in the Library of the College.]

Benevenuti Grassi. De oculis eorumque egritudinibus et curis feliciter incipit. [Ferrariæ, 1474.] [First edition of the first book printed on diseases of the eye.]

Dioscorides. De materia medica. Colle, 1478. [Said to be the first book printed at Colle.]

Isaac. Tractatus de particularibus diætis. Padua, 1487. [First edition of the first book printed on diet.]

Bagellardus. De infantium ægritudinibus et remedis. Patavii, 1487. [The second edition of the first book printed on diseases of children. First edition was 1472.]

Bernard de Gordon. Fleur de lys en médecine. Lyon, 1495. [An exceedingly rare book. The first and only edition in French in the fifteenth century.]

Johannes Peyligk. Philosophiæ naturalis. Liptzensi, 1499. [The first book published with anatomical plates of individual organs. These plates of organs were copied from the 1498 edition of Mundinus.]

The following are the titles of a few noted books issued after the year 1500:

Champerius. Index librorum in hoc volumine contentorum; Symphoriani Champerii libelli duo. Primus de medicinæ claris scriptoribus in quinque partibus tractatus. [Lugduni, 1506.] [The first edition of the first medical biography, also bibliography, published.]

Joh. Ketham. Fasciculo di medecina vulgare. Venetia, 1508. [Only two copies known of this edition: this and one in the Public Library in Venice—Stockton-Hough, 1900.]

Ambrose Paré. Briefve collection de l'administration anatomique. Paris, 1550. [This is a beautiful copy, bound by Bruyère (one of the famous French binders), of an extremely rare edition of this work].

Thomas Geminus. Treatyse of anatomie. London, 1559. [One of the earliest books on anatomy in the English language, dedicated to Queen Elizabeth, and containing what is said to be the first portrait of this Queen.]

Guilielmus Harveius. Exercitatio anatomica de motu cordis et sanguinis in animalibus. Francofurti, 1628. [The first edition of Harvey on the circulation of the blood.]

William Harvey. Anatomical exercitations concerning the generation of living creatures. London, 1653. [First edition. Only 150 copies of this work printed, of which 115 were destroyed by fire].

Peter Chamberlen. A vindication of publick artificiall baths and bath stoves. London, 1648.

Edward Jenner. The origin of the vaccine inoculation. London, 1801. [Original edition with autograph and inscription.]

A few of the rare early imprints of our own country will complete the list:

Thomas Thacher. Brief rule to guide the common people of New England how to order themselves and theirs in the small pocks, or measles. 1677. [A broadside or poster. This was the first medical publication in the colonies.]

Thomas Cadwalader. An essay on the West-India dry-gripes. Philadelphia, B. Franklin, 1745. [One of the rarest American imprints. The only known copy containing two prefaces, one of which was suppressed.]

John Morgan. Discourse upon the institution of medical schools in America. Philadelphia, William Bradford, 1765.

Journal of the Practice of Medicine, Surgery, and Pharmacy in the Military Hospitals of France. Translated from the French, by Joseph Browne. Volume I. New York [1783 or 1790?]. [The first medical journal printed in the United States.]

Cases and observations by the Medical Society of New Haven County, in the State of Connecticut, instituted in the year 1784. New Haven, J. Meigs, 1788. [The first volume of Transactions of a Medical Society published in the United States.]

An oration, which might have been delivered to the students in anatomy, on the late rupture between the two schools in this city. Philadelphia, Dobson and Lang, 1789. [Believed to have been written by Judge Hopkins.]

An act to regulate the practice of physic and surgery within this Commonwealth [Pennsylvania]. 4 pp., Philadelphia, Bradford, 1794. [This is extremely rare, probably no other copy in existence.]

There are 366 volumes of manuscripts. The following is a list of some of the more important:

A manuscript believed to have been written in the fourteenth century The leaves are of vellum, and a part of what may be called a title reads, "Secretis medici."

Original manuscript notes of Dr. Cadwalader's essay on the "Dry-gripes," published in 1745. [Deposited by Dr. S. Weir Mitchell.]

Sketch of the yellow fever of 1762. By Dr. John Redman, written in 1763.

Diary of Dr. Griffitts. Epidemic of yellow fever in Philadelphia in 1798. [Deposited by Dr. S. Weir Mitchell.]

The "Gilbert Collection" of manuscript letters in four folio volumes.

The "Carson Collection" in six quarto volumes. A history of the medical department of the University of Pennsylvania, from 1765 to 1868.

The manuscript Archives of the International Medical Congress held in Philadelphia, 1876. Four quarto volumes.

The manuscript Archives of the College of Physicians of Philadelphia, 1787 to 1847.

The collection of portraits, framed and unframed, is an extensive one: these are catalogued, and this catalogue includes the portraits found in books.

The collection of medals is not large; it contains, among others, two gold medals, one handsomely jewelled medal, and medals in honor of Franciscus Redi, Benjamin Rush, David Hosack, Edward Jenner, etc.

Medical book-plates are not collected, but allowed to remain in the books. There are some fine examples, of which eighty-four have been catalogued.

The Library of the College of Physicians of Philadelphia, for size and value of its collection, ranks, probably, as the third medical library in the world. The number of volumes cannot be taken as a guide to the value of a library, except, perhaps, when special collections have reached such proportions as the Library of the Surgeon-General's Office. The principal universities throughout the world have large libraries ranging from 100,000 to 800,000 volumes, and most of them have medical departments; but I have been unable to find that as much as one-tenth of any of these libraries are composed of medical books. The Bibliothèque de la Faculté de Médecine at Paris is given second place, with the figures stated at about 160,000 volumes.

If funds were available at this time for binding reports, dissertations, etc., the Library of the College of Physicians would contain close to 100,000 volumes. It has long since outgrown its present quarters, and a new building with modern equipment is now under consideration, and it is hoped will be erected in the near future.

ANNUAL REPORT OF THE LIBRARY COMMITTEE FOR 1906.

The number of volumes in the Library is	73,507
General Library	56,706
Lewis Library	13,373
S. D. Gross Library	3,211
Obstetrical Society Library	217
In addition to these volumes there are	
Unbound "Reports" and "Transactions"	8,798
Unbound "Theses" and "Dissertations"	20,978
Unbound Pamphlets	56,116

Included in the number of volumes there are 1954 duplicates of some of the more important periodical publications retained as reserves to replace books that are worn out by frequent use, otherwise few duplicates are retained. They are disposed of, by sale or exchange, as rapidly as possible.

More than two thousand volumes have been received, but there is not a corresponding increase in the total number reported, because, to gain room, many books not strictly medical have been disposed of and a number treating of the same subjects have been bound together. Also 7561 pamphlets and 36,152 numbers of various medical periodicals have been received.

The Library receives regularly, by purchase or exchange, 486 periodical publications, including "Transactions" and "Reports," 97 American and 389 foreign, procured as follows:

	American.	Foreign.
Henrietta Rush Fales Baker Fund	0	23
William T. Carter Fund	0	6
John D. Griscom Fund	4	33
S. D. Gross Library Account	0	5
William F. Jenks Fund	2	29
Journal Association	1	12
Oliver A. Judson Fund	0	5
William W. Keen Fund	2	14
Library Endowment Fund	3	124

	American.	Foreign.
Weir Mitchell Fund	1	31
Philadelphia Medical Society Fund	0	5
Lewis Rodman Fund	0	11
John F. Weightman Fund	0	4
Caspar Wistar Fund	3	9
By Purchase	2	16
In Exchange	79	62

Also current numbers of 339 periodicals—the gifts of editors and publishers, and the exchanges of the following journals presented to the Library by the editors:

American Journal of the Medical Sciences.
College and Clinical Record.
Medical Council.
Medical and Surgical Reporter.
Monthly Cyclopedia of Practical Medicine.
Therapeutic Gazette.
University of Pennsylvania Medical Bulletin.

We now exchange publications with the following schools:

University of Berlin.
" Bern.
" Bonn.
" Breslau.
" Erlangen.
" Giessen.
" Göttingen.
" Greifswald.
University of Halle.
" Heidelberg.
" Kiel.
" Königsberg.
" Leipzig.
" Marburg.
" Rostock.
" Strassburg.

Faculty of Medicine of Nancy.
" " " Rio de Janeiro.
" " " Toulouse.

One thousand four hundred and thirty-three inaugural dissertations have been received.

Of the 586 new books added to the Library, forty-one were written or edited by Fellows of the College, and twenty-six were presented by the following authors and editors:

Dr. Paul Bartholow (Editor),
Dr. A. C. Bernays,
Dr. J. C. Da Costa (Editor),
Dr. Franz Erben,
Dr. G. M. Gould (Editor),
Dr. H. A. Hare,
Dr. Edward Jackson,
Dr. George Ben Johnston.

Dr. Howard A. Kelly,
Dr. M. Landolt,
Dr. Henry Leffmann,
Dr. W. J. McKnight,
Dr. Edward Martin,
Dr. Prince A. Morrow,
Dr. Austin O'Malley,
Dr. G. W. Overall,
Dr. J. R. Parke,
Messrs. R. L. Polk & Co. (Editors)
Dr. H. O. Reik,
Dr. J. F. Russell,
Dr. B. Sachs,
Dr. H. R. Wharton,
Dr. J. William White,
Dr. R. N. Willson.

Twenty-one volumes were sent by the Publishers at the request of the following authors or editors:

Dr. A. P. Brubaker,
Dr. W. M. L. Coplin,
Dr. W. A. N. Dorland,
Dr. J. Norman Henry,
Dr. Barton Cooke Hirst,
Dr. Henry Leffmann,
Dr. Guthrie McConnell,
Dr. Joseph McFarland,
Dr. Henry Morris,
Dr. W. C. Posey (Editor),
Dr. G. E. de Schweinitz,
Dr. W. G. Spiller (Editor),
Dr. Louis Starr,
Dr. H. W. Stelwagon,
Dr. Alfred Stengel,
Dr. A. A. Stevens,
Dr. T. Turner Thomas,
Dr. James Thorington,
Dr. E. Q. Thornton,
Dr. James Tyson,
Dr. James K. Young.

The "Donors" during the year number 288. Those who presented twenty-five volumes or more are:

Dr. William W. Keen	118	volumes
Dr. H. A. Hare	89	"
Various Contributors through the Library of the University of Pennsylvania	77	"
Bureau of Health, Philadelphia	52	"
Dr. J. C. Reeve (Dayton, Ohio)	31	"
American Medicine Publishing Company	29	"
Dr. Morris J. Lewis	29	"
Dr. R. A. F. Penrose	26	"
Dr. Louis Starr	25	"
From the Publishing houses of:		
P. Blakiston's Son & Company	29	"
F. A. Davis Company	13	"
Lea Brothers & Company	3	"
J. B. Lippincott Company	14	"
W. B. Saunders Company	35	"
William Wood & Company	1	"

A great number of pamphlets and journals were presented by the following:

Dr. O. H. Allis,
Dr. W. H. Bennett,
Dr. H. W. Cattell,
Dr. S. Solis Cohen,
Dr. Edward P. Davis,
Dr. G. G. Davis,
Dr. A. A. Eshner,
Dr. Rebecca Fleisher,
Dr. L. F. Flick,
Dr. C. H. Frazier,
Dr. J. P. Crozer Griffith,
Dr. S. McC. Hamill,
Dr. H. A. Hare,
Dr. G. C. Harlan,
Dr. C. J. Hatfield,
Dr. F. P. Henry,
Mrs. Rush Huidekoper,
Dr. W. W. Keen,
Dr. A. O. J. Kelly,
Dr. W. W. Leach,
Dr. Morris J. Lewis,
Dr. Eugene Lindauer,
Dr. Morris Longstreth,
Dr. Edward Martin,
Dr. J. K. Mitchell,
Dr. S. Weir Mitchell,
Dr. C. P. Noble,
Dr. C. C. Norris,
Dr. R. C. Norris,
Dr. C. A. Oliver
Dr. F. R. Packard,
Dr. William E. Parke.
Dr. William Pepper,
Dr. John H. W. Rhein,
Dr. David Riesman,
Dr. C. E. de M. Sajous,
Dr. G. E. de Schweinitz,
Dr. William T. Shoemaker,
Dr. Wharton Sinkler,
Dr. John M. Swan,
Dr. C. F. Taylor,
Dr. J. J. Taylor,
Dr. E. Q. Thornton,
Dr. W. H. Trueman,
Dr. James B. Walker,
Dr. H. R. Wharton,
Dr. J. William White,
Dr. C. S. Witherstine,
Dr. H. C. Wood,
Dr. Frank Woodbury,
Dr. William Zentmayer.

American Medicine Publishing Company.
P. Blakiston's Son & Company.
J. B. Lippincott Company.
Pathological Society of Philadelphia.
W. B. Saunders Company.
John Wyeth & Brother.

The amounts expended for the purchase of books by the various Funds are as follows:

Henrietta Rush Fales Baker Fund, 66 volumes	$240.35
Luther S. Bent Fund, 23 volumes	47.33
William T. Carter Fund, 72 volumes	201.74
John D. Griscom Fund, 71 volumes	260.21
William F. Jenks Fund, 55 volumes	278.25
Oliver A. Judson Fund, 9 volumes	51.78
William V. and John M. Keating Fund, 14 volumes	35.65

William W. Keen Fund, 51 volumes	$161.26
Library Endowment Fund, 166 volumes	679.28
Weir Mitchell Fund, 51 volumes	173.57
Philadelphia Medical Society Fund, 3 volumes	30.58
Lewis Rodman Fund, 49 volumes	280.40
John F. Weightman Fund, 6 volumes	25.11
Caspar Wistar Fund, 44 volumes	199.70
Special Accounts:	
Fund for completing files of journals, 32 volumes	72.90
Journal Association, 24 volumes	149.59
New Book Fund, 35 volumes	68.64
J. Ewing Mears Account, 17 volumes	78.27
S. D. Gross Library Account, 16 volumes	92.16

From the George B. Wood Library Fund $300.41 has been expended for library supplies, stationery, etc.

One thousand six hundred and ten volumes have been bound.

There have been 7378 visits to the Library recorded, of these 3175 were made by the Fellows of the College. 21,864 volumes have been consulted beside those taken directly from the shelves by Fellows, of which no record can be kept. 5332 books have been taken out. 2838 works and 1108 volumes have been catalogued and 8164 cards have been written during the year.

All books and the more important pamphlets received during the year have been catalogued, and the work on old pamphlets bound in volumes has been completed.

The Committee appropriated $240 for the classification of the pamphlets accumulated during the past seventeen years; this work will be completed during the present year, including the additions of 1905 and 1906 (16,082). 20,952 cards have been revised, type-written, and indexed during the year.

At the request of the Library Committee the College, at its meeting of December 6, 1905, authorized the Librarian to solicit contributions to defray the expense of completing the revision of the catalogue of the Library. Within six weeks' time the Librarian had obtained subscriptions of sufficient amount to complete the work of revision; these subscriptions to be paid in full; or, in three payments as best suited the subscribers. About three-fifths of the amount subscribed has been received.

This year the books of the entire Library have been examined and compared with the shelf-list. At the last stock-taking (1904) three books were reported as missing, viz.:

1. Army Medical Department Report 1882, v. 24, London, 1884.
2. Galen, C. De l'usage des parties du corps humaine, 16°, Lyon, 1566.
3. de La Condamine, C. M. History of Inoculation, 12°, New Haven, 1754.

One of these (Galen) was found later, the others have not been found and, as yet, we have been unable to replace them. This year two books are reported as missing, viz.:

1. Allbutt, T. C., and Teale, T. P. Clinical Lectures on Scrofulous Neck and on Surgery of Scrofulous Glands. 8°, London, 1885.

2. Mallory, F. B., and Wright, J. H. Pathological Technique. Third edition. 8°, Phila., Saunders, 1904.

One of these (Mallory and Wright) has been replaced through the courtesy of the publishers.

With the books piled and crowded, and scattered in fifteen rooms and galleries, it is impossible to exercise proper supervision, and it is remarkable that more are not mislaid or lost. Great credit is due to the employés of the Library for their faithful, careful, and efficient work under the present discouraging conditions.

As considerable time must yet be passed in our present quarters, the need of additional shelf room is imperative, and your Committee hope that the College may grant the use of the meeting-room on the first floor for temporary shelving.

The accompanying balance sheet of the Treasurer shows the receipts and expenditures.

The current expenses of the Library, aside from the purchase of books, for the coming year are estimated at $5343.

George C. Harlan,
Chairman.

ABSTRACT OF THE REPORT OF THE COMMITTEE ON MÜTTER MUSEUM, 1906.

In addition to the usual fresh specimens sent from time to time to the Museum this year many contributions of instruments have been made. Some of these are antique, and many ordinary ones belonged to deceased Fellows.

A notable collection was presented by the late Professor William S. Forbes shortly before his death. This consisted of a set of lithotrites of various sizes, made after his own pattern. These, owing to their character, great power, and mode of application possessed a remarkable crushing force. They were used by Dr. Forbes in his later life. He then gathered them together, cased them and brought the box to the curator, with the request that he would take good care of the instruments. They possess almost a pathetic interest. He had finished with them. Their work was done, a work of which the surgeon, our colleague, was justly proud.

From Dr. Anna Broomall was received a collection of obstetric instruments.

Dr. Keen presented among other objects a Davy rectal lever for compression of the common iliac artery to prevent hemorrhage in operations on the lower extremity, especially hip-joint amputations.

During the past winter session constant use has been made by the professors of the different schools for demonstration of the many valuable teaching specimens on our shelves. On the diseases of bones the Museum is very rich, especially in the rarer forms, to which constant reference has been made. The demonstrations have been to classes of varying size, generally to students of the Senior or Junior years. The specimens were taken from the shelves and replaced by the curator as needed by the teacher.

The objects themselves when being used were placed on rolling tables and every precaution taken to secure their safety and to prevent loss or injury.

The students have fully appreciated the value of these demonstrations, and the behavior of the classes has been, without exception, excellent. In several instances they have by resolution expressed in writing their high sense of the worth of such instruction and their indebtedness to the Museum and the College for the opportunities of study these afforded them.

The classes in the aggregate numbered nearly 1000 from the Senior and Junior classes of the University, the Jefferson, the Medico-Chirurgical, and the Women's. Smaller classes have also shared in demonstrations of an obstet-

rical and of a more strictly medical character, by Drs. Boyd W. Taylor, and Ward Brinton.

In a communication recently received from a professor thus using the Museum as a means of class demonstration and instruction he says: "I sincerely trust that the 'Plans Committee' are going to provide adequate quarters for the Museum, not only for the collection, but for demonstration in the new building."

The annual exhibition of the Pathological Society was held in the Hall of the Museum. It was continued through two evenings and was largely attended. The display of pathological objects was large, full of interest, and exceedingly instructive.

All of which is respectfully submitted.

J. H. Brinton,
Chairman.

LIST OF PAPERS: SECTION ON OPHTHALMOLOGY.

December, 1905.

Exhibition of a Second Case of Keratitis Disciformis, by Dr. Wm. Campbell Posey.

Exhibition of a Case of Cyst of the Iris, Developing after Traumatism, by Drs. G. E. de Schweinitz and E. A. Shumway.

Unusual Degenerative Corneal Changes Following Traumatism and Secondary Glaucoma, by Drs. G. E. de Schweinitz and E. A. Shumway.

A Case of Monocular Blindness Occasioned by Visible Spasm of the Central Artery of the Retina, by Dr. D. Forest Harbridge (by invitation).

The Relation of Convergence and Accommodation, by Dr. H. F. Hansell.

Exhibition of a Case of Congenital Tubular Growth of the Fundus, by Dr. Wm. M. Sweet.

Exhibition of a Case of Gumma of the Eyelid, by Dr. Wm. M. Sweet.

January, 1906.

Exhibition of a Case of Essential Shrinking of the Conjunctiva, by Dr. Wm. M. Sweet.

Exhibition of a Case of Trachoma in a Young Negro Girl, by Dr. Burton Chance.

Exhibition of a Case of Argyrosis from the Use of Argyrol, by Dr. Wm. Zentmayer for Dr. Wm. Campbell Posey.

A Case of Pneumococcus Conjunctivitis with Unusual Complications, by Dr. G. E. de Schweinitz.

Remarks on the Use of Newer Silver Salts, by Dr. G. E. de Schweinitz.

A Case of Extraction of a Piece of Steel from the Crystalline Lens, with the Electric Magnet, by Dr. H. F. Hansell.

Exhibition of a Case of Probable Bilateral Obstruction of the Central Artery of the Retina, by Dr. Wm. Zentmayer.

February, 1906.

A Series of Orbital Cases in Children, by Dr. W. C. Posey.

Exhibition of a Case of Cavernous Angioma of the Orbit, by Dr. S. D. Risley.

A Case of Bilateral Gumma of the Orbit, by Dr. F. C. Parker (by invitation).

Exhibition of a Drawing of an Exquisite Case of Dendritic Keratitis, by Dr. B. Alex. Randall.

A Drawing of a Coloboma of the Iris, which took the Form of a Raphe, by Dr. B. Alex. Randall.

Exhibition of a Patient with Double Choroidal Coloboma, Drawn Twenty Years ago for Dr. Norris, Now Having Retinal Hemorrhages, Probably of Nasal Causation, by Dr. B. Alex. Randall.

Exhibition of a Case of Methyl-Alcohol Amaurosis, by Dr. G. E. de Schweinitz and E. A. Shumway.

A Case of Metastatic Ophthalmitis with Recovery, by Dr. G. E. de Schweinitz.

Exhibition of Two Cases of Retinitis Pigmentosa, with but Little Pigment, by Dr. Wm. Zentmayer.

Exhibition of a Case of Retained Hyaloid Artery and Coloboma of the Choroid Above, by Dr. Wm. Zentmayer.

Exhibition of a Case of Bilateral Removal of the Lens for High Myopia; the Subsequent Use of Dionin, by Dr. H. F. Hansell.

March, 1906.

Exhibition of a Case of Embolism of the Central Artery of the Retina, by Dr. S. D. Risley for Dr. G. C. Harlan.

Some Forms of Hereditary Cataract, by Dr. Casey A. Wood, of Chicago (by invitation).

Exhibition of a Case of Retinitis Proliferans, by Dr. Wm. Zentmayer.

Exhibition of a Case of Vernal Conjunctivitis, Treated by the *x*-rays, by Dr. Wm. Zentmayer.

Concerning Macular Exhaustion and Central Scotomas in Certain Psychoses, by Dr. G. E. de Schweinitz.

April, 1906.

Exhibition of a Case Showing Unusual Success from Iridotomy, in Eyes Practically Blind from Iridocyclitis and Complicated Cataracts, by Dr. W. C. Posey.

V-Shaped Iridotomy; Knife-needle *vs.* Scissors, by Dr. S. L. Ziegler.

Exhibition of a Case of Choroido-Retinal Sclerosis, with Spontaneous Dislocation of the Lenses, by Dr. Wm. T. Shoemaker.

Exhibition of a Case of Persistent Hyaloid Artery in Both Eyes; Unusual Variety in Left Eye, by Dr. Wm. T. Shoemaker.

Exhibition of a Case of Multiple Retinal Traumatic Lesions, by Dr. J. T. Carpenter.

Traumatic Ophthalmoplegia, with Cases, by Dr. G. E. de Schweinitz.

Exhibition of a Case of Ulcer of the Cornea in Diplobacillus Conjunctivitis, by Dr. E. A. Shumway.

October, 1906.

A Case of Bilateral Abducens Paralysis Traumatic in Origin, by Dr. H. F. Hansell.

Exhibition of a Case of Double Rupture of the Sclera by the Blow of a Fist, by Dr. E. A. Shumway.

A Congenital Tumor of the Corneo-Scleral Junction, with Gland Inclusion, by Drs. G. E. de Schweinitz and C. M. Hosmer (by invitation).

Concerning Lid Epitheliomas in an Early Stage of Development, with Cases by Drs. G. E. de Schweinitz and C. M. Hosmer (by invitation).

Exhibition of a Case of Embolism of a Cilio-Retinal Vessel, by Dr. Wm. Zentmayer.

Exhibition of a Case of Keratitis Disciformis, by Dr. C. A. Veasey.

Exhibition of a Case of Fulminant Retrobulbar Neuritis, by Dr. C. A. Veasey.

Exhibition of a Bedside Ophthalmic Examination Case, by Dr. Wm. C. Posey.

Exhibition of a Case of Neuro-Retinitis, with Some Unusual Features, by Dr. H. M. Langden (by invitation).

November, 1906.

A Review of the Treatment and its Results of One Hundred and Twenty-nine Cases of Gonococcic Conjunctivitis in Adults and Infants in the Philadelphia General Hospital During the Last Six Years, by Dr. T. B. Holloway (by invitation).

Some Unusual Ocular Manifestations of Gonorrhœa, by Dr. W. C. Posey.

A Report of Two Cases of Parinaud's Conjunctivitis, by Dr. Frederick Krauss.

Report on the Pathological Study of Eyeballs with (*a*) Flat Pigmented Sarcoma and (*b*) Posterior Staphyloma, by Drs. G. E. de Schweinitz and C. M. Hosmer (by invitation).

A Case of Extraction of Steel from the Vitreous; Purulent Hyalitis; Recovery by Dr. H. F. Hansell.

EDWARD A. SHUMWAY,
Clerk.

LIST OF PAPERS: SECTION ON OTOLOGY AND LARYNGOLOGY.

December 20, 1905.

Dr. G. Hudson Makuen read a paper on "The Physiology of Speech in Relation to Stammering."

Dr. G. M. Marshall reported "A Case of Thyrotomy."

January 17, 1906.

Dr. W. G. B. Harland read a paper on "Intratracheal Injections."

Dr. B. A. Randall reported "A Case of Sinus Phlebitis with Suspicion of Brain Abscess."

Dr. B. H. Potts read a paper on "Primary Thrombosis of the Jugular Bulb."

February 21, 1906.

Dr. Frank Woodbury read a paper on "Brow Ague: Frontal Sinus Congestion with Periodic Headaches."

Dr. E. L. Vansant reported "A Case of Persistent Tinnitus Aurium Cured by Eustachian Inflation with Heated Air."

Dr. G. Hudson Makuen "Some Remarks on the Treatment of Stammering, with Exhibition of a Patient."

Dr. D. Braden Kyle read a paper on "The Use of the Falsetto Voice in Hysterical Aphonia."

March 21, 1906.

Dr. G. C. Stout reported "An Unusual Operation on the Frontal Sinus for Chronic Suppuration." Exhibition of patient.

Dr. J. S. Gibb read a paper on "Calculi in the Salivary Duets. Report of a Case."

Dr. B. A. Randall read a paper on "Reiterated Claims for the Tuning-fork Tests of Deafness."

April 18, 1906.

Dr. W. G. B. Harland read a paper entitled "Report of a Case in which Disagreeable, but not Dangerous, Symptoms Followed an Application of Adrenalin to the Nose."

October 17, 1906.

Dr. Randall reported (1) "A Patient with Cholesteatoma Breaking out Behind the Auricle. (2) Report of Two Cases of Exostosis with Retention of Epidermis in the Canal."

Dr. Harland and Dr. H. K. Pancoast gave "A Demonstration of a Series of Skiagraphs of the Accessory Sinuses of the Nose."

Dr. G. E. Pfahler, by invitation, gave "A Demonstration of the Diseases of the Mastoid Cells and Accessory Sinuses of the Nose by Radiograph."

Dr. Kyle read "A Report of Observations of Cyanotic Pharyngitis due to High Altitudes."

November 21, 1906.

Dr. Randall exhibited "A Skiagraph Showing a Hyperostosis of the Canal."

Dr. Makuen read a paper on "The Voice as an Index to Diseases of the Throat, Nose, and Ear, with Exhibition of Illustrative Cases."

Dr. Harland reported "A Case of Cerebellar Abscess; Operation; Recovery."

Dr. Potts read a paper on "Difficulties in Diagnosis of Brain Abscess with Report of (1) Abscess of the Temporosphenoidal Lobe; Operation; Recovery. (2) Thrombosis of the Jugular Bulb with Cerebellar Abscess; Operation; Death; Autopsy."

B. H. Potts,
Clerk of Section.

LIST OF PAPERS: SECTION ON GENERAL MEDICINE.

December, 1905.

Exhibition of a Patient Presenting Certain Unusual Features of Angina Pectoris, by Dr. F. J. Kalteyer.

The Clinical Significance of Precordial Pain, by Dr. W. E. Hughes.

Clinical Observations on the Effects of *x*-rays in Certain Medical Diseases, by Dr. D. L. Edsall.

A Clinical Report of Cases of Typhoid Fever with Suppurative Complications, with Special Reference to Changes in the Blood, by Dr. J. A. Scott.

A Case of Paratyphoid Fever, by Dr. J. M. Swan.

January, 1906.

Clinical Observations on Exophthalmic Goitre (Graves' Disease), with Special Reference to Complete and Incomplete Forms, the Clinical Course, and the Treatment, by Dr. George Dock, of Ann Arbor, Michigan (by invitation).

The Medical Treatment of Exophthalmic Goitre, by Dr. James Tyson.

The Pathogenesis of Exophthalmic Goitre, by Dr. W. G. MacCallum, of Baltimore (by invitation).

The Surgical Treatment of Exophthalmic Goitre, by Dr. Joseph C. Bloodgood, of Baltimore (by invitation).

February, 1906.

A Patient with Aortic Insufficiency, Attributed to Traumatic Rupture of the Aortic Leaflets, by Dr. F. J. Kalteyer.

Hysterical Neuroses of the Stomach, by Dr. James H. Lloyd.

A Patient with Rhythmic Borborygmi of Hysterical Origin, by Dr. James H. Lloyd.

Pulmonary Abscess Followed by Recovery without Operation, together with a Study of the Case by Means of the *x*-rays, by Drs. James M. Anders and George E. Pfahler.

Recent Therapeutic Experiences with Pneumonia, by Dr. S. Solis Cohen.

March, 1906.

A Case of Scleroderma, by Dr. David Riesman.

Cervical Rib Associated with Cervicobulbar Palsy, by Drs. William G. Spiller and J. C. Gittings.

Mercurial Nephritis, with the Report of a Case, by Dr. Robert N. Willson.

Two Cases of Aneurysm of the Aorta, by Dr. M. Howard Fussell.

A Case of Aneurysm of the Descending Aorta of Unusual Size, by Dr. J. A. Scott.

A Case of Aneurysm of the Aorta Leading to the Development of a Bronchoesophageal Fistula, by Drs. A. O. J. Kelly and R. S. Lavenson.

April, 1906.

A Suppositious Tumor of the Epigastrium, in a Girl aged Fourteen Years, Attributed to Hysterical Contracture of the Rectus and Other Abdominal Muscles, by Dr. T. L. Coley.

A Fatal Case of Acute Dilatation of the Stomach, by Dr. H. A. Hare.

Accidental Rashes in Typhoid Fever, by Dr. D. J. Milton Miller.

Orchitis in Typhoid Fever, with a Report of Two Cases, by Dr. N. B. Gwyn.

October, 1906.

The Muscle-nucleus Test in Pancreatic Disease, by Dr. J. Dutton Steele.

Typhoid Fever with Unusual Enlargement of the Spleen, by Dr. Henry D. Jump.

A Study of 500 Cases of Pleurisy at the Pennsylvania Hospital, by Dr. Frederick Fraley.

Methods of Altering the Secretion of Pepsin, by Drs. Joseph Sailer and Clifford B. Farr.

The Treatment of Acute Gastritis, by Dr. Hermann B. Allyn.

Some Clinical Aspects of Indicanuria, by Dr. Judson Daland.

November, 1906.

A Patient with Congenital Disease of the Pulmonary Valve of the Heart, by Dr. A. P. Francine.

A Patient with Marked Venous Obstruction of the Trunk, by Dr. H. A. Hare.

The Estimation of the Functional Capacity of the Heart, by Dr. George W. Norris.

A. O. J. Kelly,
Clerk of Section.

LIST OF PAPERS: SECTION ON GYNECOLOGY.

January, 1906.

A General Surgeon's Views on Some Pelvic Conditions in Women, by Dr. Robert T. Morris (guest).

February, 1906.

Final Report on a Case of Deciduoma Malignum, by Dr. Charles P. Noble.

The Causes and Treatment of Metrorrhagia, with Especial reference to the Use of Schatz's Metranoikter and Atmokausis, by Dr. John C. Hirst.

April, 1906.

Two Cases of Bilateral Dermoid Cysts: One Showing Carcinomatous Degeneration, the Second Complicated by the Presence of an Eighty-one Pound Multilocular Ovarian Cyst, by Dr. Charles C. Norris.

Adenocarcinoma of the Abdominal Wall Developing Subsequent to the Removal of Benign Ovarian Neoplasms, by Dr. Edward A. Schumann.

A Review of Fourteen Cesarean Sections Successfully Performed, by Dr. George M. Boyd.

Meningocele of Unusual Size, by Dr. George M. Boyd.

Ruptured Extrauterine Pregnancy with Amniotic Sac Intact, by Dr. George Erety Shoemaker.

Unruptured Ectopic Gestation Sac, by Dr. Wilmer Krusen.

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